

HP xw4550 Workstation

Service and Technical Reference Guide



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453097-004

Fourth Edition, April 2008

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1 Product overview

This chapter presents an overview of the hardware components of the HP xw4550 Workstation, including the following topics:

- [Product features on page 2](#)
- [Product specifications on page 7](#)
- [ENERGY STAR on page 11](#)
- [Dual-core processors on page 13](#)
- [HP Cool Tools on page 13](#)

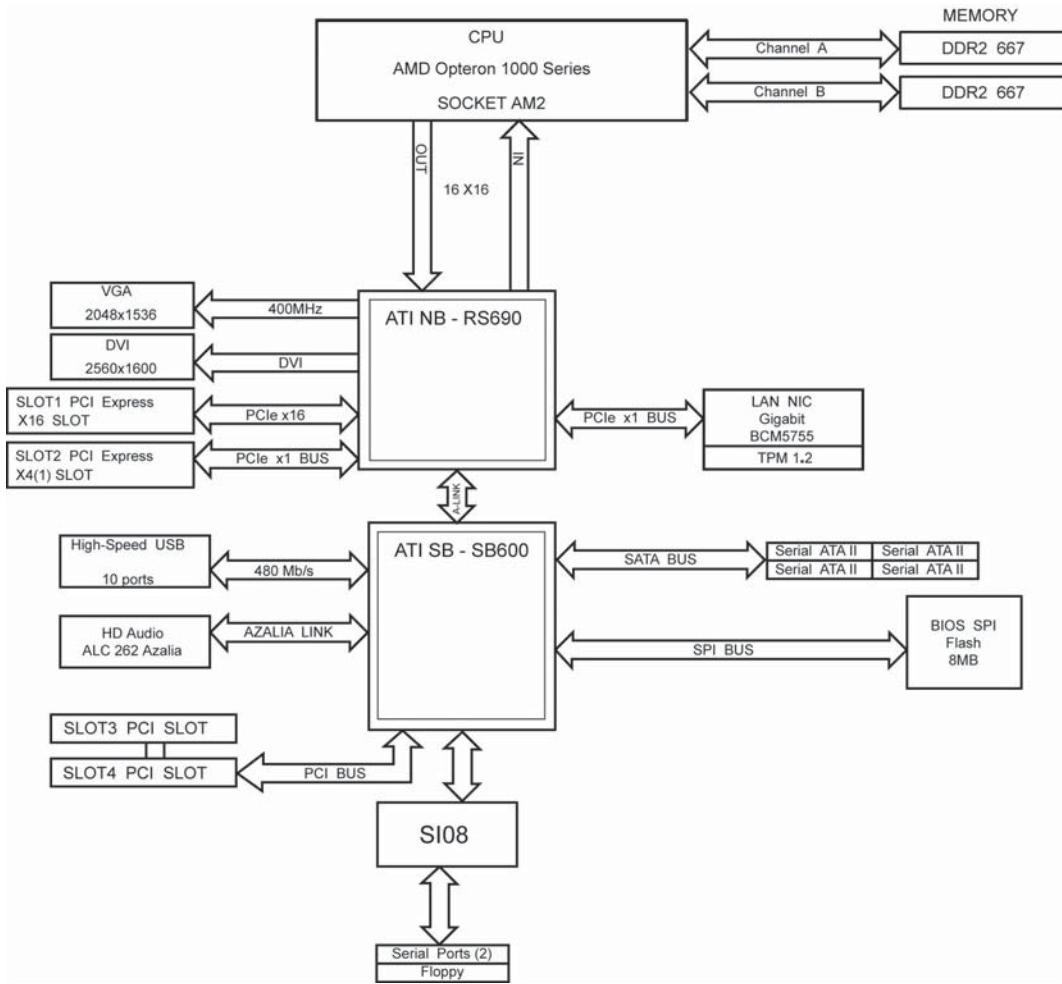
Product features

This section describes the product features of the HP xw4550 Workstation.

System board architecture

The following figure shows the HP xw4550 Workstation block diagram.

Figure 1-1 HP xw4550 Workstation system board block diagram



Component view

The following figure shows components of a typical HP xw4550 Workstation. Drive configurations might vary.

For information about supported replacement parts, see: <http://partsurfer.hp.com>.

Figure 1-2 HP xw4550 Workstation component view

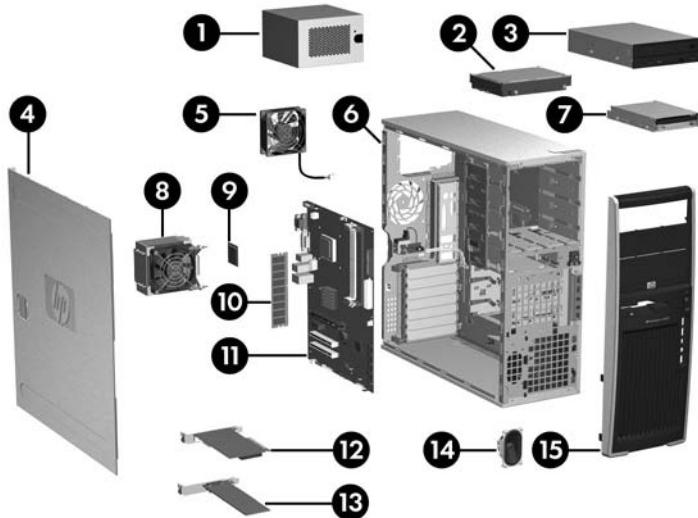


Table 1-1 Component view

Item	Description	Item	Description
1	Power supply	9	Processor
2	Hard drive	10	Memory module
3	Optical drive	11	System board
4	Side access panel	12	PCI Express card
5	System fan	13	PCI card
6	Chassis	14	Speaker
7	Diskette drive	15	Front bezel
8	Processor heatsink		

Front panel components

The following image shows a typical HP xw4550 Workstation. Drive configurations might vary.

Figure 1-3 Front panel components

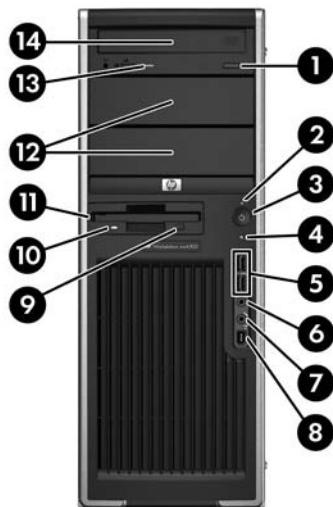


Table 1-2 Front panel components

Item	Symbol	Description	Item	Symbol	Description
1		Optical drive eject button	8		IEEE-1394 Connector (optional)
2		Power on light	9		Diskette drive eject button
3		Power button	10		Diskette drive activity light
4		Hard drive activity light	11		Diskette drive (optional)
5		Universal Serial Bus 2.0 (USB) (x2)	12		Secondary drive bays (x2)
6		Headphone connector	13		Optical drive activity light
7		Microphone connector	14		Optical drive

Rear panel components

The following illustrations shows a typical HP xw4550 Workstation.

 **NOTE:** The rear panel connectors are labeled with industry-standard icons and colors to assist you in connecting your peripheral devices.

Figure 1-4 Rear panel components

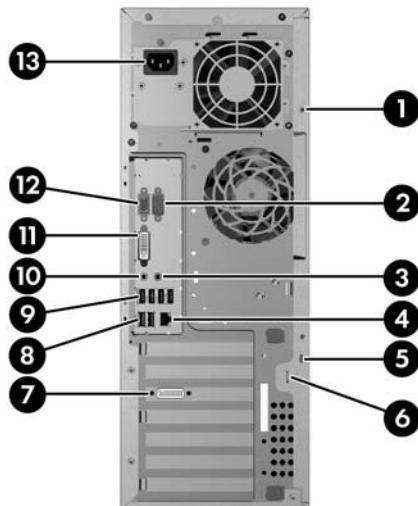


Table 1-3 Rear panel components

Item	Symbol	Description	Item	Symbol	Description
1		Universal chassis clamp opening	7		Optional PCI Express graphics card adapter NOTE: When installed, disables the workstation integrated graphics output.
2		Serial connector	8 & 9		USB 2.0 (x6)
3		Audio line-in connector (light blue)	10		Microphone connector (pink)
4		RJ-45 network connector	11		DVI integrated graphics connector NOTE: Disabled when an optional PCI Express graphics card is installed.
5		Cable lock slot	12		VGA connector
6		Padlock loop	13		Power cord connector

Serial number and COA label location

Each workstation has two unique serial number labels (1) and a Certificate of Authentication (COA) label (2) (for Windows preinstalled workstations only). In general, the serial number labels can be found on the top panel or on the side of the workstation and at the rear of the workstation. Keep this number available when contacting customer service for assistance.

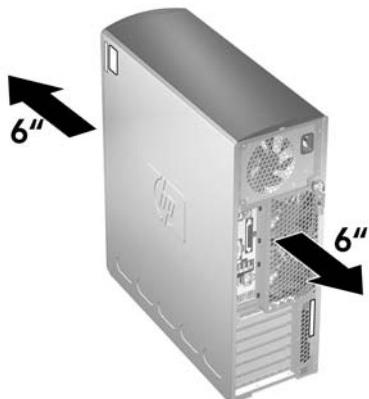
Figure 1-5 Serial number and COA label location



Maximizing the airflow

- Keep your workstation in an area where the airflow is not obstructed.
- Keep the workstation off of surfaces where dust can gather.
- Keep the front of the workstation clear of any obstruction.
- Remove any dust on the front panel (vent area) and the rear fans with a small vacuum, compressed air, or dust rag.
- Keep the back of the workstation at least 0.15m (6 in.) away from a wall or other obstruction.

Figure 1-6 Maintain proper clearance



Product specifications

The following table lists the physical dimensions for the HP xw4550 Workstation.

Table 1-4 Physical characteristics

Weight (typical configuration)	15.88 kg (35 lb)
Tower dimensions	45 cm (17.7 in.) high
	16.8 cm (6.6 in.) wide
	45.6 cm (17.9 in.) deep

Power supply

The power supply for the HP xw4550 Workstation is a 300-watt, 80Plus energy efficient power supply compatible with Energy Star requirements. This section describes the power supply specifications.

Power supply description

This section describes the 80Plus power supply for the HP xw4550 Workstation.

Source voltage	Description
+3.33V	PCI, PCI Express, audio, SB600, RS690, super I/O, BIOS ROM, and on-board logic
+5.08V	Storage (disk, optical, diskette), PCI, PCI Express, RS690, audio, keyboard/mouse, input to on-board regulator, super I/O
+12V	PCI, PCI Express, system fans, storage (disk, optical, diskette)
+12 VCPU	Input to on-board regulator that supplies power for the processor
-12V	PCI, serial port
5.08 aux	Sleep circuitry

Table 1-5 Max current per rail

Voltage rail	Maximum continuous current
3.33V	16A
5.08V	19A
12 VCPU	11.5A
+12V	11A
-12V	0.15A
5.08V aux	2.0A

WARNING! Do not exceed 300 watts of total continuous output power.

Power supply specifications

Table 1-6 Power supply specifications

Item	Description
Power supply	300-W custom power supply (Wide Ranging, Active PFC)
Operating voltage range	90-264 VAC
Rated voltage range	100-240 VAC
Rated line frequency	50-60 Hz
Operating line frequency range	47-63 Hz
Rated input current	5.0A @ 100-120 VAC 2.5A @ 200-240 VAC
Heat dissipation (Configuration and software dependent)	Typical 431 Btu/hr.= (108 kg-cal/hr.) Maximum 1331 Btu/hr. = (336 kg-cal/hr.)
Power Supply fan	80 mm x 25 mm, variable speed
Energy Star compliant	Yes
FEMP Standby Power Compliant @ 115V (<2W in S5 – Power Off)	Yes
Power Consumption in ES Mode – Suspend to RAM (S3) (Instantly Available PC)	< 3W

Power consumption and cooling

The following example workstation configuration and supporting tables list the power consumption and heat dissipation for a typical configuration based on primary power consumptions:

- 1 x AMD® Opteron™ 3.0 GHz processor 1222 Series
- 4 x 1-GB, DDR, 667-MHz memory modules
- 1 x FX1700 graphics card
- 1 x 250-GB SATA hard drive
- 1 x optical drive
- 1 x diskette drive

Table 1-7 Example 1 energy consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
On-Idle (ENERGY STAR® Idle (S0))	50.9W		52.7W		51.0W	
ENERGY STAR® PTEC (Total Energy Consumption) Windows running Linpack and Viewperf (S0)	181.3W		176.2W		179.6W	
Windows Busy Max (S0)	200.1W		192.0W		196.7W	

Table 1-7 Example 1 energy consumption (continued)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
ENERGY STAR® “Sleep” (S3)*	2.93W	2.06W	6.58	2.36	2.80W	2.04W
ENERGY STAR® “Standby” (Off) (S5)	1.69W	0.94W	2.00W	1.23W	1.67W	0.92W

* Energy Star low energy mode.

Table 1-8 Example 1 heat dissipation**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
On-Idle (ENERGY STAR® Idle (S0))	173.6 Btu/hr		179.7 Btu/hr		174.0 Btu/hr	
ENERGY STAR® PTEC (Total Energy Consumption) Windows running Linpack and Viewperf) (S0)	618.6 Btu/hr		601.2 Btu/hr		612.8 Btu/hr	
Windows Busy Max (S0)	682.9 Btu/hr		655.3 Btu/hr		671.3 Btu/hr	
ENERGY STAR® “Sleep” (S3)*	10.0 Btu/hr	7.03 Btu/hr	12.2 Btu/hr	8.05 Btu/hr	9.56 Btu/hr	6.96 Btu/hr
ENERGY STAR® “Standby” (Off) (S5)	5.77 Btu/hr	3.21 Btu/hr	6.83 Btu/hr	4.20 Btu/hr	5.70 Btu/hr	3.14 Btu/hr

* Energy Star low energy mode.

** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Configuration 2

- 1 x AMD Opteron 2.0 GHz 1212 Series
- 2 x 512-GB, DDR2, 667-MHz memory modules
- Integrated graphics
- 1 x 80 GB SATA hard drive
- 1 x optical drive
- 1 x diskette drive

Table 1-9 Example 2 energy consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
On-Idle (ENERGY STAR® Idle (S0))	38.8W		36.9W		39.1W	
ENERGY STAR® PTEC (Total Energy Consumption) Windows running Linpack and Viewperf (S0)	96.6W		94.5W		99.5W	
Windows Busy Max (S0)	112.3W		108.1W		115.3W	
ENERGY STAR® "Sleep" (S3)*	2.64W	1.78W	2.84W	2.10W	2.10W	1.79W
ENERGY STAR® "Standby" (Off) (S5)	1.75W	0.98W	2.00W	1.25W	1.75W	0.95W

* Energy Star low energy mode.

Table 1-10 Example 2 heat dissipation**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
On-Idle (ENERGY STAR® Idle (S0))	132.4 Btu/hr		125.9 Btu/hr		133.5 Btu/hr	
ENERGY STAR® PTEC (Total Energy Consumption) Windows running Linpack and Viewperf (S0)	329.6 Btu/hr		322.6 Btu/hr		339.7 Btu/hr	
Windows Busy Max (S0)	383.3 Btu/hr.		369.0 Btu/hr		393.5 Btu/hr	
ENERGY STAR® "Sleep" (S3)*	9.01 Btu/hr	6.08 Btu/hr	9.69 Btu/hr	7.17 Btu/hr	8.91 Btu/hr	6.11 Btu/hr
ENERGY STAR® "Standby" (Off) (S5)	5.97 Btu/hr	3.34 Btu/hr	6.83 Btu/hr	4.27 Btu/hr	5.97 Btu/hr	3.24 Btu/hr

* Energy Star low energy mode.

** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

-  **NOTE:** When you power down your workstation with the power button on the front panel, the power consumption falls below 10W. To reach zero power consumption, remove power from the workstation. For additional information on power-saving features, see your operating system documentation.

System fans

The workstation includes a rear chassis fan, one processor heatsink fan, and one power supply fan. An optional front PCI fan is available for special considerations, such as graphics PCI cards.

Resetting the power supply

If an overload triggers the power supply overload protection, all power is immediately disconnected. To reset the power supply unit:

1. Disconnect the power cord.
2. Determine what caused the overload and correct the problem.
3. Reconnect the power cord, apply power, and reboot the workstation.

 **NOTE:** When you power down your workstation with the power button on the front panel, the power consumption falls below 10W. To reach zero power consumption, remove power from the workstation. For additional information on power-saving features, see your operating system documentation.

Environmental specifications

This section describes environmental specifications of your workstation.

Temperature	Operating: 5 to 35°C (40 to 95°F) Non-operating: -40 to 60°C (-40 to 140°F) NOTE: Derate by one degree C (1.4 degrees F) for every 305m (1,000 ft.) altitude over 1,524m (5,000 ft.).
Humidity	Operating: 8 to 85% RH, non-condensing Non-operating: 8 to 90% RH, non-condensing
Altitude	Operating: 0 to 3,048m (10,000 ft.) Non-operating: 0 to 9,144m (30,000 ft.)
Shock	Operating: ½-sine: 40g, 2-3ms Non-operating: <ul style="list-style-type: none">• ½-sine: 160 cm/s, 2-3ms (~100g)• square: 422 cm/s, 20g NOTE: Values represent individual shock events and do not indicate repetitive shock events.
Vibration	Operating random: 0.5g (rms), 5-300 Hz Non-operating random: 2.0g (rms), 10-500 Hz NOTE: Values do not indicate continuous vibration.

ENERGY STAR

Hewlett-Packard computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR specifications for computers. The EPA ENERGY STAR Logo does not imply endorsement by the EPA. As an ENERGY STAR Partner, Hewlett-Packard Company has determined the products marked with the ENERGY STAR Logo are ENERGY

STAR qualified as per the applicable ENERGY STAR guidelines for energy efficiency. The following logo will appear on all ENERGY STAR qualified computers:

Figure 1-7 ENERGY STAR logo



The ENERGY STAR Computers Program was created by the EPA to promote energy efficiency and reduce air pollution through more energy-efficient equipment in homes, offices, and factories. One way products achieve this is by reducing power consumption when not being used through the Microsoft Windows ® Power Management feature.

The Power Management feature allows the computer to enter into a low-power or “sleep” mode after a period of user inactivity. When used with an external ENERGY STAR compliant monitor, this feature will also support similar power management features of the monitor. To take advantage of this energy savings:

- The Power Management feature has been preset to power down the computer after 30 minutes of user inactivity.
- The Power Management feature has been preset to power down the monitor after 15 minutes of user inactivity.

Both the computer and monitor can be woken from “sleep” mode through user interaction with any of the computer’s input devices (for example; mouse, keyboard, and others). When configured with Wake On LAN (WOL) enabled, the computer can also be awoken by a network signal.

More information on the energy and financial savings potential of the Power Management Feature can be found at the EPA’s ENERGY STAR Power Management website: <http://www.energystar.gov/powermanagement>.

More information on the ENERGY STAR program and its environmental benefits is available by visiting the EPA ENERGY STAR Web site: <http://www.energystar.gov>.

 **CAUTION:** Using the Energy Save Monitor feature with non-ENERGY STAR compliant monitors may cause video distortion when the Energy Save timeout occurs.

 **NOTE:** ENERGY STAR is not supported on Linux workstations.

If you must restore the operating system, reset the ENERGY STAR settings (if applicable) after the restore.

Using the ENERGY STAR Save Monitor feature with non-ENERGY STAR-compliant monitors might cause video distortion when the Energy Save timeout occurs.

 **NOTE:** Not all configurations of the HP xw4550 Workstation are Energy Star compliant. For information on configurations of this workstation that are Energy Star compliant, contact your HP sales representative.

To verify the factory default power settings for your product, select **Start>Control Panel** and double-click **Power Options**.

Dual-core processors

The HP xw4550 Workstation contains a dual-core processor. Dual-core processors provide the workstation with two true processors in a single socket, and can better handle the load of multi-threaded applications (such as rendering an image in Digital Content Creation) and highly multi-tasked environments (such as running several productivity applications while listening to music).

HP Cool Tools

The HP xw4550 Workstation comes preloaded with additional software that is not automatically installed when you first boot your operating system. Additionally, a number of valuable preinstalled tools on your workstation can enhance your workstation experience. To access or learn more about these applications:

- Open the **HP Cool Tools** folder by selecting **Start>All Programs>HP Cool Tools**.
- Select the **HP Cool Tools** icon on the desktop.

To learn more about these applications, click **HP Cool Tools—Learn More**.

To install or launch the applications, click the appropriate application.

2 Configuring and restoring the operating system

This chapter describes configuring and restoring the operating system.

- [Setting up Microsoft Windows Vista Business software on page 15](#)
- [Setting up Microsoft Windows XP Professional software on page 18](#)
- [HP Backup and Recovery Manager restore points on page 21](#)
- [Protecting the software on page 22](#)
- [HP software on page 22](#)
- [Setting up Red Hat Linux on page 22](#)
- [Setting up Red Flag Linux on page 24](#)

If your workstation was shipped with a preinstalled operating system, it is configured automatically the first time your workstation is powered on.

△ **CAUTION:** Do not add optional hardware or third-party devices to the HP workstation until the operating system is successfully configured. Adding hardware might cause errors and prevent the operating system from configuring correctly.

Setting up Microsoft Windows Vista Business software

This section describes how to configure and restore Microsoft® Windows Vista® Business software.

Configuring the Windows Vista Business operating system

Configuring the software

The operating system is configured when you first apply power to the workstation. This process takes approximately 5 to 10 minutes. Carefully follow the instructions on the screen to complete the configuration.

△ **CAUTION:** After the automatic configuration has begun, do not power off your workstation until this process completes. Powering off your workstation during the configuration process might damage the software that runs the system.

For complete operating system installation and configuration instructions, see the operating system documentation provided with your workstation. Additional information is available in the online help tool after you successfully configure the operating system.

Selecting a language

At the first boot of the factory preinstalled operating system, you might be prompted to select a language for the operating system. After selecting the language, read and follow the instructions on the screen to complete configuration of the operating system. This process might take quite a while, depending on

the system hardware configuration and the language choice. During the process, do not power off your workstation unless you are directed to do so.

 **NOTE:** After you have selected a language during initial boot of the operating system, the language will be locked in on the hard drive. If the system is restored with HP Backup and Recovery, only the previously selected language can be installed. If using RestorePlus! DVDs, the RestorePlus! DVD checks for the language stored on the hard drive and restores only the original preinstalled language. If a new hard drive is installed or no language is found on the disk, the RestorePlus! DVD installs any language requested.

Creating recovery disks

Refer to [Restoring the Windows Vista Business operating system on page 16](#) for details on the HP Backup and Recovery process.

Installing or upgrading device drivers

Required device drivers must be installed after you configure the operating system, and before you install their respective hardware devices. In addition, for optimum performance, your operating system must have the most recent updates, patches, and software fixes. Access the following resources for driver and software updates:

- See the Microsoft site to obtain updates for your operating system, including current patches and software fixes.
- Device drivers are provided on a CD supplied with the peripheral device.
- Some peripheral device drivers developed for Microsoft Windows XP Professional or Microsoft Windows Vista Business might not be shipped with your workstation. To locate the current device drivers, see: http://www.hp.com/support/workstation_swdrivers.
- For documentation on installing drivers and workstation operation, see: http://www.hp.com/support/workstation_manuals .

Restoring the Windows Vista Business operating system

Your workstation has several methods to restore your Windows Vista operating system to a near-factory state, or to the state of the system at a predefined restore point. Your system has a recovery partition on the system hard drive that contains software and data required for the restore process as described in the following sections.

 **NOTE:** If you must restore the operating system with Windows Vista Business OEM DVDs (installing without using the Restore Plus! DVDs), you must call Microsoft to provide a Stock Keeping Unit (SKU) number. The SKU information is on the service tag and is the OS product number in the lower right hand section of the tag. It should display "OS: XXXXXXX," where "XXXXXXX" is the OS product number.

Using the HP Backup and Restore process

The Windows operating system and device drivers (for devices shipped with the system) are reinstalled using this process. The HP Backup and Restore (HPBR) process can be executed from DVD, CD, or from the recovery partition contained on your system hard drive. Select **Start>All Programs>HP Backup & Recovery>HP Backup and Recovery Manager** to launch the HPBR.

 **CAUTION:** Backup your data before you attempt any operating system restore. All data on the Windows partition will be deleted when you perform a system restore using the HPBR process. However, the recovery partition on the system drive and other partitions should not be affected.

Creating system recovery DVDs or CDs

You can create a set of the DVDs or CDs from your system if you have a DVD or CD writer. After launching the HP Backup and Restore Manager, you can create ISO images of the factory image, or write them directly to CD or DVD media. You can also create a supplemental HP Backup and Recovery Manager CD. (There may be additional CDs you can create depending on the options you purchased.) You also have the option to move images of the CDs to another location, such as a network share, to be written to DVD or CD at a later time or from another system.

Restoring from HPBR DVDs or CDs

To start the system recovery process, boot from the previously-created DVD or CD and carefully follow the online instructions.

Restoring directly from the recovery partition

Follow these steps to start the HPBR system restore process from the Recovery Manager:

1. Boot the workstation.
2. When prompted on the boot splash screen to enter the Recovery Manager, press **F11**.
3. Follow the prompts to restore the system to a factory-like condition.

Reclaiming hard disk space from the recovery partition

To free up disk space, you can remove only the recovery partition, or you can completely uninstall the HP Backup and Recovery Manager application.

△ **CAUTION:** If the recovery partition is removed:

- The **F11** Emergency Recovery function is not available.
- The ability to recover the system is lost.
- Any recovery images contained in the recovery partition are deleted.
- The ability to create a recovery media set is lost.

- **Removing only the recovery partition** – The recovery partition can be removed by selecting **Remove HP Recovery Partition** in the HP Backup & Recovery program folder. When the HP Recovery Partition is removed; the recovery partition is deleted, the user partition is extended to reclaim the unused hard drive space, and the F11 boot prompt is removed. The HP Backup and Recovery Manager application remains and can be used for data backup and restore.
- **Uninstalling the HP Backup and Recovery Manager application** – The HP Backup and Recovery Manager application can be uninstalled using the **Windows Control Panel>Programs and Features** utility. When the application is uninstalled, the recovery partition is deleted, the user partition is extended to reclaim the unused space, and the F11 boot prompt is removed. Emergency recovery as well as data backup and recovery is not possible after the application is uninstalled.

Ordering backup software

If you are unable to create system recovery CDs or DVDs, you can order a recovery disk set from the HP support center.



NOTE: Before calling HP to order the software, have your workstation serial number available.

To obtain the support center telephone number for your region:

1. See: <http://www.hp.com/support/contactHP>.
2. Select your region.
3. Under the Call HP heading, select **Technical support after you buy**.

Transferring files and settings using Windows Easy Transfer

Windows Easy Transfer, the Microsoft data migration tool, provides a guide that helps you choose what files and data to transfer from another Windows computer to your Windows Vista Business workstation and how to transfer it. You can use one of the following interconnect or storage methods with Windows Easy Transfer to migrate data from another Windows computer to your workstation:

- **Network** – Can be used when both the source computer and your workstation are connected to the same network.
- **Easy Transfer Cable** – A specially designed USB cable that can connect the source computer to your workstation when completing a Windows Easy Transfer. Note that an Easy Transfer Cable is not a standard USB cable, but is also commonly available from local electronic suppliers.
- **DVDs or CDs** – Can be used if you have writeable DVD or CD drives on the source computer and your workstation.
- **USB flash drive or an external hard drive** – Can access both the source computer and your workstation.

To use the Windows Easy Transfer tool, select **Start>All Programs>Accessories>System Tools>Windows Easy Transfer**.



NOTE: For more information on using Windows Easy Transfer, see: <http://www.microsoft.com/windows/products/windowsvista/features/details/easytransfer.mspx>.

Setting up Microsoft Windows XP Professional software

This section describes how to configure and restore Microsoft® Windows XP™ Professional software.

Configuring Microsoft Windows XP Professional software

This section describes how to configure the Windows XP software.

Configuring the software

The operating system is configured when you first apply power to the system. This process takes approximately 5 to 10 minutes. Carefully follow the instructions on the screen to complete the configuration.



CAUTION: After the automatic configuration has begun, do not power off your workstation until this process completes. Powering off your workstation during the configuration process might damage the software that runs the system.

For complete operating system installation and configuration instructions, see the operating system documentation provided with your workstation. Additional information is available in the online help tool after you successfully configure the operating system.

Selecting a language

At the first boot of the factory preinstalled operating system, you might be prompted to select a language for the operating system. After selecting the language, read and follow the instructions on the screen to complete the configuration of the operating system. This process might take quite a while, depending on the system hardware configuration and the language choice. During the process, do not power off your workstation unless you are directed to do so.

 **NOTE:** After you have selected a language during initial boot of the operating system, the language will be locked-in on the hard drive. If the system is restored with HP Backup and Recovery, only the previously selected language can be installed. If using RestorePlus! DVDs, the RestorePlus! DVD checks for the language stored on the hard drive and restores only the original preinstalled language. If a new hard drive is installed or no language is found on the disk, the RestorePlus! DVD installs any language requested.

Creating recovery disks

When a new operating system is installed, you are prompted to create recovery disks. Refer to [Restoring the Windows XP Professional operating system on page 19](#) for details on the HP Backup and Recovery process.

Installing or upgrading device drivers

Required drivers must be installed after you configure the operating system, and before you install their respective hardware devices. In addition, for optimum performance, your operating system must have the most recent updates, patches, and software fixes. Access the following resources for driver and software updates:

- See the Microsoft site to obtain updates for your operating system, including current patches and software fixes.
- Device drivers are provided on a CD supplied with the peripheral device.
- Some peripheral device drivers developed for Windows XP or Vista might not be shipped with your workstation. To locate the current device drivers, see: http://www.hp.com/support/workstation_swdrivers.
- For documentation on installing drivers and workstation operation, see: http://www.hp.com/support/workstation_manuals .

Restoring the Windows XP Professional operating system

Your workstation has several methods to restore your Windows XP operating system to a near-factory state, or to the state of the system at a predefined snapshot in time. Your system has a recovery partition on the system hard drive that contains software and data required for the restore process as described in the following sections.

The RestorePlus! process

The Windows operating system and device drivers (for devices shipped with the system) are reinstalled using this process. Some application software may not be restored using the RestorePlus! process. In this case you must install the application software from the appropriate application CD. The RestorePlus! process can be executed from CD or from the recovery partition contained on your system hard drive.

 **CAUTION:** Back up your data before you attempt any operating system restore. All data on the Windows partition will be deleted when you restore using the RestorePlus! process. However, the recovery partition on the system drive and other partitions should not be affected.

Creating a RestorePlus! CD

You can create a set of the CDs from your system if you have a CD writer. When you first boot your system, you will be prompted to make CDs for RestorePlus!, the Windows operating system, and a supplemental HP Backup and Recovery Manager CD. (There may be additional CDs you can create depending on the options you purchased.) You also have the option to move images of the CDs to another location, such as a network share, to be written to CD at a later time or from another system.

Restoring from RestorePlus! CDs

The RestorePlus! process can be started by powering up from the RestorePlus! CD.

Restoring from RestorePlus! on the Recovery Partition

Follow these steps to start the RestorePlus! process from the Emergency Recovery menu:

1. Boot the workstation.
2. Press **F11** when prompted during the boot process to enter the Emergency Recovery menu. The F11 prompt appears briefly during the boot process.
If you have a recovery partition but the F11 prompt is not visible:
 - a. Press **F10** to access the setup menu.
 - b. Select **Advanced** from the drop down menu.
 - c. Select **Power-On Options**.
 - d. Ensure that the F11 prompt is set to **Displayed**.
 - e. Ensure that **Factory Recovery Boot Support** is set to **Enabled**.
 - f. Reboot the workstation and press **F11** when prompted.
3. Select **Recover PC's factory installed operating system, drivers, utilities, and applications** from the Emergency Recovery menu.

 **NOTE:** Some applications might not be restored using this method.

Reclaiming hard disk space from the recovery partition

The recovery partition can be removed to reclaim the hard drive space.

 **CAUTION:** If the recovery partition is removed:

- The **F11** Emergency Recovery function is not available.
 - The ability to recover the system from data on the recovery partition is lost.
 - Any recovery images contained in the recovery partition are deleted.
 - The ability to create a recovery media set is lost.
-

To free up disk space, you can remove only the recovery partition, or you can completely uninstall the HP Backup and Recovery Manager application.

△ **CAUTION:** If you uninstall the HP Backup and Recovery Manager application, emergency recovery and data backup and recovery are no longer possible.

- **Removing only the recovery partition** – The recovery partition can be removed by selecting **Remove HP Recovery Partition** in the HP Backup & Recovery program folder. When the HP Recovery Partition is removed; the recovery partition is deleted, the user partition is extended to reclaim the unused hard drive space, and the F11 boot prompt is removed. The HP Backup and Recovery Manager application remains and can be used for data backup and restore.
- **Uninstalling the HP Backup and Recovery Manager application** – The HP Backup and Recovery Manager application can be uninstalled using the **Windows Control Panel>Programs and Features** utility. When the application is uninstalled, the recovery partition is deleted, the user partition is extended to reclaim the unused space, and the F11 boot prompt is removed. Emergency recovery as well as data backup and recovery is not possible after the application is uninstalled.

△ **CAUTION:** Deleting the recovery partition or uninstalling the HP Backup and Recovery Manager application reduces or eliminates the ability to recover the system.

Ordering backup software

If you are unable to create system recovery CDs or DVDs, you can order a recovery disk set from the HP support center.

 **NOTE:** Before calling HP to order the software, have your workstation serial number available.

To obtain the support center telephone number for your region:

1. See: http://welcome.hp.com/country/us/en/wwcontact_us.html.
2. Select your region.
3. Under the Call HP heading, select **Technical support after you buy**.

HP Backup and Recovery Manager restore points

HP Backup and Recovery Manager is preinstalled on your workstation. This software allows you to backup and restore your system and data. You will be prompted to make RestorePlus! CDs at the first boot of the system. An Initial Restore Point (IRP) will be created automatically. This restore point is a complete snapshot of the system partition at the time the IRP was created. The IRP is stored in the recovery partition on the system hard drive, but you can also write the IRP to CDs, DVDs, or copy it to another location. The restore point can be used to return the system partition back to the state the system was when captured.

Restoring from the HP Backup and Recovery Manager restore point CD or DVDs

The HP Backup and Recovery Manager (HPBR) restore point can be written to CD or DVDs and used to restore the system. Typically you would use the CD/DVD set if the hard drive has been replaced or all partitions have been corrupted. Boot the system from the HPBR restore point CD/DVD and follow the online instructions.

Restoring from the HP Backup and Recovery Manager restore point on the Recovery Partition

The HP Backup and Recovery Manager (HPBR) Initial Restore Point is stored in the system recovery partition and can be restored using the Emergency Recovery menu. Boot your system and press the **F11** key when prompted to enter the Emergency Recovery menu. The F11 prompt appears briefly during

the boot process. From the Emergency Recovery menu, choose **Recover PC to a specific point in time** and follow the instructions.

Protecting the software

To protect software from loss or damage, keep a backup copy of all system software, applications, and related files stored on the hard drive. See the operating system or backup utility documentation for instructions on making backup copies of data files.

HP software

The following HP software may be installed on your workstation depending on the operating system and options:

- Computer Setup (F10) Utility and diagnostic features
- HP Support Software including device drivers
- Security Management tools (optional)
- Software Support Management tools

Additional software is available for download:

- HP Client Manager Software is available at: <http://www.hp.com/go/easydeploy>.
- System Software Manager is available at: <http://www.hp.com/go/ssm>.



NOTE: Additional HP software might be required in certain situations.

Setting up Red Hat Linux

This section describes how to configure and restore Red Hat Linux-preinstalled workstations. Follow the instructions in this section to set up your operating system and software.

After the boot process completes, you can view additional HP Linux documentation by opening your Internet browser (the browser is automatically set to use the local HP documentation page as its default). You can also access Linux Web links for Red Hat (Internet access required) by using your Internet browser.

For additional information about setting up Linux-preinstalled workstations, refer to the *HP User Manual for Linux* at: http://www.hp.com/support/linux_user_manual.

For more information about HP and Linux, see: <http://www.hp.com/linux>.

Starting the Linux operating system

The first time your workstation is booted, the Red Hat First Boot utility displays. This program enables you to enter your password, network, time, and keyboard settings for your workstation.



CAUTION: After the automatic installation has begun, do not power down your workstation until the process is complete. Powering down your workstation during the installation process might damage the software that runs your workstation or prevent its proper installation.

When you enable the YPBind feature in the Network tab of the Linux Setup Tool, you might get a blank screen for about 15-30 seconds after you have selected and saved all of your settings and exited the utility. This behavior is normal. The boot process continues to execute after the screen returns.

Restoring the Linux operating system

To restore the Linux operating system, you must have the HP Driver CD and RHEL restore media. Download the latest HP Driver CD to get any new enhancements. This section provides information on how to:

- Create restore media.
- Download the latest HP driver CD contents.
- Reinstall the factory Linux image with the HP driver CD contents.

 **NOTE:** Linux does not support mixed drive types for a manufacturing preload. When restoring the operating system, mixed drive types can be handled with the restoring media.

Creating restore media

Workstations that are preloaded with HP Red Hat Linux have an icon on the display desktop with the label “Red Hat ISOs.” Select this icon to go to the **/iso** directory. The **/iso** directory contains all of the ISO images used to preload your HP Red Hat Linux operating system. To recover or restore the original image, follow the instructions in the README file in the **/iso** directory to record the ISO image file onto CDs.

 **NOTE:** HP recommends that you record the ISO recovery images to CD as backup files to be used in the event of a possible disk failure.

The **/iso** directory also contains an ISO image of the HP Driver CD used to create your preloaded system. You can either use this version or download the latest version.

Downloading the latest HP driver CD contents

Download the latest HP Driver CD to receive any new enhancements as follows:

1. See http://www.hp.com/support/workstation_swdrivers.
2. Find your workstation model and operating system.
3. Select your driver CD under **Software**, and follow the directions under **Release Notes**.

Reinstalling the factory Linux image with the HP driver CD contents

1. Boot your workstation from the Binary CD 1 of the restore media.
2. Insert the Linux operating system CDs.
3. Continue following the prompts until the operating system is successfully installed.
4. Configure the X server to start on reboot.
5. Reboot your workstation.
6. Follow the prompts to set up your system with the Red Hat First Boot utility.
7. When prompted in First Boot to add additional CDs, insert the HP Driver CD into the optical drive tray of your workstation.
8. Select **Install** next to Additional CDs. The HP Driver CD window opens.
9. Select **Press** to begin install.

When the install is done, you will have two options available—**Reboot now...** on the left side and **Press to continue, reboot later...** on the right side.

10. Select **Reboot now...**

Upgrading device drivers

To upgrade a Linux device driver, see: http://www.hp.com/support/workstation_swdrivers.

Linux-enabled workstations

Linux-enabled workstations do not have Linux preinstalled, nor do they include installation media for a Linux distribution. To install Linux, you must have the installation binary set for a Linux distribution (CD or DVD media, or a version on your network), and the HP Installer Kit for Linux.

The installer kit includes the HP CDs necessary to complete the installation of all versions of the distribution box set that are supported by HP workstation hardware.

To determine which versions are supported on your workstation, see the Linux hardware support matrix at http://www.hp.com/support/linux_hardware_matrix.

To use the drivers in the HP Installer kit for Linux other than RHEL, you must manually extract the drivers from the HP Driver CD and install them. HP does not test the installation of these drivers on other Linux distributions, nor does HP support this operation.

Setting up Red Flag Linux

Hewlett-Packard offers the Red Flag Linux operating system as a preloaded option on the HP xw4550 Workstation in certain countries, but does not, however, support the Red Flag Linux operating system. For more information on Red Flag Linux and the Red Flag operating system software, see: <http://www.redflag-linux.com>.

3 System management

This chapter describes the various tools and utilities that support system management on the workstation, and include information on the following sections:

- [Computer Setup \(F10\) Utility on page 25](#)
- [Workstation management on page 32](#)

Computer Setup (F10) Utility

The Computer Setup (F10) Utility enables you to:

- Change factory default settings and set or change the system configuration, which might be necessary when you add or remove hardware.
- Determine if all of the devices installed on the workstation are recognized by the system and functioning properly.
- Determine information about the operating environment of the workstation.
- Solve system configuration errors detected but not automatically fixed during the Power-On Self-Test (POST).
- Establish and manage passwords and other security features.
- Establish and manage energy-saving time-outs (not supported for Linux platforms).
- Modify or restore factory default settings.
- Set the system date and time.
- Set, view, change, or verify the system configuration, including settings for processor, graphics, memory, audio, storage, communications, and input devices.
- Modify the boot order of installed mass storage devices such as SATA, diskette drives, optical drives, network drives, and LS-120 drives.
- Configure the boot priority of SATA hard drive controllers.
- Enable or disable Network Server Mode, which enables the workstation to boot the operating system when the power-on password is enabled with or without a keyboard or mouse attached. When attached to the system, the keyboard and mouse remain locked until the power-on password is entered.
- Select POST Messages Enabled or Disabled to change the display status of POST messages. POST Messages disabled suppresses most POST messages, such as memory count, product name, and other non-error text messages. If a POST error occurs, the error is displayed regardless of the mode selected. To manually switch to POST Messages Enabled during POST, press any key (except F1 through F12).
- Establish an Ownership Tag, the text of which is displayed each time the system is powered on or restarted.
- Enter the Asset Tag or property identification number assigned by your company to this workstation.

- Enable power-on password prompting during system restarts (warm boots) and power-on.
- Hide or make available the integrated I/O functionality, including the serial, or USB ports, audio, or embedded network interface controller (NIC). Any hidden devices are inaccessible and increase overall system security.
- Enable or disable removable media boot ability.
- Enable or disable removable media write ability (when supported by hardware).
- Replicate your system setup by saving system configuration information on diskette and restoring it on one or more workstations.
- Execute self-tests on specified SATA hard drives (when supported by the drive).

BIOS ROM

The BIOS of the computer is a collection of machine language programs stored as firmware in ROM. The BIOS ROM includes such functions as POST, PCI device initialization, plug-in-play support, power management activities, and the Computer Setup (F10) Utility. The firmware contained in the BIOS ROM supports the following systems and specifications:

- Microsoft WHQL
- Alert-On-LAN (AOL) and Wake-On-LAN (WOL)
- ACPI 1.0 and OnNow
- SMBIOS 2.3.5
- PC98/99/00 and NetPC
- PXE boot ROM for the integrated LAN controller
- BIOS Boot Specification 1.01
- Enhanced Disk Drive Specification 3.0
- “El Torito” Bootable CD-ROM Format Specification 1.0
- ATAPI Removable Media Device BIOS Specification 1.0
- MPS Specification 1.4 (for booting Linux SMP)

The BIOS ROM is a 1MB Serial Peripheral Interface (SPI) part. The runtime portion of the BIOS resides in a 128-K block from E0000h to FFFFFh.

Using the Computer Setup (F10) Utility

You can only open the Computer Setup (F10) Utility by powering on the workstation or restarting the workstation. To access the Computer Setup (F10) Utility menu:

1. Power on or restart the workstation.
 2. Press the **F10** key as soon as your display is active and you see **F10=Setup** appear in the lower right corner of the screen.
-
-  **NOTE:** If you do not press **F10** at the appropriate time, try again. Turn the workstation off, then on, and press **F10** again to access the utility, or press the **Ctrl + Alt + Delete** keys before boot if you miss the opportunity to press **F10**.
3. Select your language from the list and press the **Enter** key. In the Computer Setup (F10) Utility menu, five headings are displayed: **File**, **Storage**, **Security**, **Power**, and **Advanced**.

4. Use the arrow (left and right) keys to select the appropriate heading. Use the arrow (up and down) keys to select the option you want, and press **Enter**.
5. To apply and save changes, select **File>Save Changes** and then select **F10=YES**.
 - If you have made changes that you do not want applied, select **Ignore Changes** and then select **F10=YES**.
 - To reset to factory settings, select **File>Default setup>Restore Factory Settings as Default**. Press **F10** to accept the changes. Select **Apply Defaults and Exit**. This option restores the original factory system defaults.

 **CAUTION:** Do not power off the workstation while the ROM is saving your Computer Setup (F10) Utility changes because the Complementary Metal-Oxide Semiconductor (CMOS) could become corrupted. After you exit the F10 Setup screen, it is safe to disconnect power from the workstation.

Computer Setup (F10) Utility menu

 **NOTE:** The following content is subject to change with new BIOS releases, so your menu might be different than shown.

Table 3-1 Computer Setup (F10) Utility menu descriptions

Heading	Option	Description
File	System Information	Lists: <ul style="list-style-type: none"> • Product Name • SKU Number • Processor Type/Speed/Stepping • Cache Size (L1/L2) • Installed Memory Size • Integrated MAC • System BIOS • Chassis Serial Number • Asset Tracking Number
	About	Displays copyright information.
	Set Time and Date	Enables you to set system time and date.
Flash System ROM		CD-ROM – Enables you to upgrade the BIOS from a ROM image on CD. NOTE: Optical drives must be in Legacy or Native mode. USB – Enables you to upgrade the BIOS from a ROM image on a USB drive or memory stick.
Replicated Setup		Save to Removable Media Saves the system configuration, including CMOS, in the QSETUP.TXT file. This file can be saved to a formatted, blank 1.44-MB diskette or to a USB-connected storage device.
		Restore from Removable Media Restores system configuration from a diskette.
Default Setup		Save Current Settings as Default Saves the current settings as default settings for the next operation.

Table 3-1 Computer Setup (F10) Utility menu descriptions (continued)

Heading	Option	Description
	Restore Factory Settings as Default	Restores the factory settings as the default settings for the next operation.
	Apply Defaults and Exit	Restores factory default settings.
	Ignore Changes and Exit	Exits the computer setup without applying or saving any changes.
	Save Changes and Exit	Saves changes to system configuration and exits the computer setup.
Storage	Device Configuration	Lists all installed non-SCSI storage devices and provides options for getting specific information about each device.
	Hard Disk	Provides information about the hard disk drives in the system.
	CD-ROM	Provides information about the optical drives in the workstation.
	Diskette Type (for legacy diskette drives only)	Identifies the highest capacity media type accepted by the diskette drive. Options are 3.5" 1.44 MB, 5.25" 1.2 MB, and Not Installed.
SATA defaults	Restores or resets SATA defaults	<p>Default Values</p> <p>Resets devices to their SATA default configuration.</p>
	Multisector Transfers	Options are 8, 16, and Disable; 16 is default.
	Transfer Mode	Specifies the active data transfer mode. Options (subject to device capabilities) are Max UDMA, PIO 0, Max PIO, Enhanced DMA, and Ultra DMA0; Max UDMA is default.
	Translation Mode	Enables BIOS to automatically determine the translation mode used to configure a previously formatted SATA or USB mass storage device. This prevents you from having to know how the mass storage device was previously formatted.
		Ordinarily, the translation mode selected automatically by the BIOS should not be changed. If the selected translation mode is not compatible with the translation mode that was active when the disk was partitioned and formatted, the data on the disk will be inaccessible.
		Translation Mode Options are Automatic, Bit Shift, LBA Assisted, Use (Cylinders, Heads, Sectors), and Off; Automatic is default.
Storage Options	Removable Media Boot	Enables/disables ability to boot the system from removable media.
	Legacy Diskette Write	Enables/disables ability to write data to removable media.
	SATA Emulation	Sets the SATA emulation mode with the following options: <ul style="list-style-type: none">• RAID—RAID OPROM executes. This emulation mode offers the best performance and most functionality.• LEGACY MODE IDE – Offers standard SATA support (four ports only).• NATIVE MODE IDE – Offers full SATA and SATA-II functionality with no support for RAID.
DPS Self-test		Enables you to select a drive test for a SATA drive. It is not available for RAID configurations.

Table 3-1 Computer Setup (F10) Utility menu descriptions (continued)

Heading	Option	Description
	Boot Order	<p>Enables you to configure the boot, diskette drive, and hard drive orders by physically reordering the menu entries. The default boot order presents these selections:</p> <ul style="list-style-type: none">• ATAPI – CD-ROM Drive• Diskette Drive• USB Device• Hard Drive• Broadcom Ethernet controller <p>Press Enter to drag a device to a preferred place. Press F5 to remove the device from consideration as a bootable device.</p> <p>NOTE: MS-DOS drive lettering assignments might not apply after a non-MS-DOS operating system has started.</p> <p>Boot devices can be disabled from participating in the boot order process. These order changes are reconciled with the IPL/BCV historical information and stored in the physical ROM part when the F10 Setup changes are confirmed with File/Save Changes and Exit.</p> <p>You can temporarily override the boot order. To boot one time from a device other than the default device specified in Boot Order, restart the workstation and press F9 when the F9=Boot Menu message appears on the screen. After POST completes, a list of bootable devices is displayed. Use the arrow keys to select the preferred bootable device and press Enter. The workstation then boots from the selected non-default device for this one time.</p>
Security	Setup Password	<p>Enables you to set and enable setup (administrator) password.</p> <p>NOTE: If the setup password is set, it is required to change computer setup options, flash the ROM, and make changes to certain PNP settings under Windows.</p>
	Power-On Password	Enables you to set and enable the power-on password.
	Password Options	<p>Lock Legacy Resources—Prevents the operating system from changing resources to serial and diskette controller.</p> <p>Setup Browse Mode—if a setup password is created, this mode enables read-only access to the F10 Setup menu for users without a password.</p>
	Smart Cover	Allows you to disable cover removal sensor or to notify user if sensor has been activated.
	Device Security	<p>Makes the following devices available or unavailable to the system:</p> <ul style="list-style-type: none">• Serial port• All USB ports• System audio• Network controller• Embedded Security Device <p>For each device, Device Available is the default setting and allows the operating system access to the device. Device Hidden makes the device unavailable; it is disabled by the BIOS and cannot</p>

Table 3-1 Computer Setup (F10) Utility menu descriptions (continued)

Heading	Option	Description
		<p>be enabled by the operating system. When enabled, Embedded Security Device offers these options:</p> <ul style="list-style-type: none">● Embedded Security Device Support● Enable/Disable—Turns the TPM on/off. If enabled, these options become available:<ul style="list-style-type: none">○ Power-On Authentication Support – Enables/disables an authentication feature that requires you to enter a TPM user key password to boot the system. This feature uses the TPM to generate and store the authentication password.○ Reset Authentication Credential – Resets the authentication functionality and clears all authentication credentials.
		<p>NOTE: A setup password must be set to enable the Embedded Security Device and to access any security features associated with the Embedded Security Device.</p>
	Network Service Boot	Enables/disables the ability to boot to the network by way of the F12 key or the boot order.
	System IDs	<p>Asset Tag—a 16-byte string identifying the system.</p> <p>Ownership Tag—an 80-byte string identifying ownership of the system. This tag is displayed on the screen during POST.</p>
		Universal Unique Identifier (UUID)—can only be updated if the current chassis serial number is invalid. (These ID numbers are normally set in the factory and are used to uniquely identify the system.)
		Keyboard—enables you to set the keyboard locale for System ID entry.
	DriveLock Security	Allows you to select a hard drive, enable/disable DriveLock security on that drive, and set a DriveLock password. This option appears only if your drive supports DriveLock. <p>CAUTION: Enabling DriveLock can render a hard drive permanently inaccessible if the master password is lost or forgotten. No method exists to recover the password or access the data.</p>
	Operating System Security	Data Execution Prevention—enables/disables Data Execution Prevention mode in the processors. This mode prohibits code from running in pages that were set up as data pages, and prevents attacks such as buffer overflows. Operating system support is required for this feature.
		Virtualization Technology – enables Virtualization Technology to increase workstation performance.
		OS Management of Embedded Security Device—enables/disables the ability of the operating system to control the TPM device. This includes turning it on/off, initializing it, and resetting it.
		Reset of Embedded Security Device through OS.—enables/disables the ability of the operating system to reset the TPM.
	Setup Security Level	Enables the administrator to selectively set the security level for each setup feature. The options are Setup Password and None. Browser mode must be enabled to use this option.
Power	OS Power Management	Enables/disables: <ul style="list-style-type: none">● ACPI S3 Hard Disk Reset● USB Wake on Device Insertion● Unique Sleep State Blink Rates
	Thermal	Enables you set the rate of the system fan when processor is in idle.
Advanced**	Power-On Options	Allows you to set: <ul style="list-style-type: none">● POST Mode (QuickBoot, FullBoot, or FullBoot every 1–30 days).● POST Messages (Enable/Disable).

Table 3-1 Computer Setup (F10) Utility menu descriptions (continued)

Heading	Option	Description
	<ul style="list-style-type: none">• F9 Prompt (Enable/Disable). Enabling this feature displays the text F9=Boot Menu during POST. Disabling this feature prevents the text from being displayed. However, pressing the F9 key still accesses the boot menu.• F10 Prompt (Enable/Disable). Enabling this feature displays the text F10=Setup during POST. Disabling this feature prevents the text from being displayed, but pressing F10 still accesses the Setup screen.• F11 Prompt (Enable/Disable). Makes the Factory Recovery option visible during POST. Disabling this feature prevents the text from being displayed, but pressing F10 still accesses the Setup screen. Factory Recovery Boot Support must be enabled to use this option.• F12 Prompt (Enable/Disable). Enabling this feature displays F12=Network Service Boot during POST. Disabling this feature prevents the text from being displayed but pressing F12 still forces the system to attempt booting from the network.• Factory Recovery Boot Support (Enable/Disable). Recovery partition (HDD) option available. Vista leaves the factory with this support in place.• Option ROM prompt* (Enable/Disable). Enabling this feature causes the system to display a message before loading options ROMs.• Remote Wakeup Boot Source• After Power Loss (On/Off); the previous state is the default.• POST Delay (in seconds) (Enable/Disable). Enabling this feature adds a user-specified delay to the POST process. This delay is sometimes needed for hard disks on some PCI cards that spin up slowly—so slowly that they are not ready to boot by the time POST is finished. The POST delay also gives you more time to select F10 to enter the Computer Setup (F10) Utility.• Limit (CPUID Maximum Value to 3) (Enable/Disable)	
Execute Memory Test		Tests workstation memory. The workstation reboots and any changes that have been made are lost. The workstation might boot with memory in a sub-optimal configuration.
BIOS Power-On		Enables you to disable or specify a weekday and time for BIOS power-on.
Onboard Devices		Enables you to set resources for or disable onboard system devices such as serial ports and diskette controllers. Operating system parameters generally override Onboard Devices settings.
Bus Options	<p>The options are:</p> <ul style="list-style-type: none">• PCI SERR# Generation (Enable/Disable)• PCI VGA Palette Snooping (Enable/Disable)• ECC Support (Enable/Disable)	
Device Options	<ul style="list-style-type: none">• Num Lock State at Power-On (off/on)• S5 Wake-on-LAN (Enable/Disable)• Processor Cache (Enable/Disable)• Internal Speaker (Enable/Disable)• Monitor Tracking (Enable/Disable)• NIC PXE Option ROM Download (Enable/Disable)• SATA RAID Option ROM Download (Enable/Disable)• HPET (Enable/Disable)	

* Available on selected models.

**These options should be used by advanced users only.

Workstation management

HP Client Management Solutions are available for download from <http://www.hp.com/go/easydeploy>. They provide standards-based solutions for managing and controlling workstations in a networked environment. This section summarizes the capabilities and features of the key components of workstation management:

- Initial configuration and deployment
- Remote system installation
- Updating and managing software
- ROM flash
- Asset tracking and security
- Fault notification and recovery

 **NOTE:** Support for specific features described in this guide might vary by model or software version.

Initial configuration and deployment

The workstation comes with a preinstalled system software image. After a brief software unbundling process, the workstation is ready to use.

You might prefer to replace the preinstalled software image with a customized set of system and application software. Several methods are available for deploying a customized software image, including:

- Installing additional software applications after unbundling the preinstalled software image
- Using a disk cloning process to copy the contents from one hard drive to another

The best deployment method depends on your information technology environment and processes. The PC Deployment section of the HP Lifecycle Solutions Web site (<http://whp-sp-orig.extweb.hp.com/country/us/en/solutions.html>) provides information to help you select the best deployment method.

The Restore Plus! CD, ROM-based setup, and ACPI hardware provide further assistance with recovery of system software, configuration management and troubleshooting, and power management.

Remote system installation

Remote system installation enables you to start and set up your system using the software and configuration information located on a network server. This feature is usually used as a system setup and configuration tool and can be used for the following tasks:

- Deploying a software image on one or more new PCs
- Formatting a hard drive
- Installing application software or drivers
- Updating the operating system, application software, or drivers

To initiate a remote system installation, press when the message appears in the lower-right corner of the HP logo screen. Follow the onscreen instructions to continue the process. The default boot order is a BIOS configuration setting that can be changed to always attempt to PXE boot.

HP and Altiris have partnered to provide tools designed to make the task of corporate PC deployment and management easier and less time-consuming, ultimately lowering the total cost of ownership and making HP PCs the most manageable client PCs in the enterprise environment.

Replicating the setup

The following procedures enable you to easily copy one setup configuration to other workstations of the same model for faster, more consistent configuration of multiple workstations.

 **NOTE:** Both procedures require a diskette drive or a USB device such as an HP Drive Key.

To collect and replicate BIOS settings on multiple computers, use System Software Manager or HP Client Manager Software. For more information, see: <http://www.hp.com/go/easydeploy>.

Copying to a single workstation

To copy to a single workstation, complete the following steps:

 **CAUTION:** A setup configuration is model-specific. File system corruption can result if source and target workstations are not the same model. For example, do not copy the setup configuration from one workstation model to another.

1. Select a setup configuration to copy, and reboot the workstation.
 2. As soon as the boot up process begins, press and hold the **F10** key until you enter the Computer Setup (F10) Utility. Press **Enter** to bypass the title screen, if necessary.
-  **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and press and hold the **F10** key again to access the utility.
3. If you are using a diskette or other storage device, insert it now. If not, proceed.
 4. Select **File>Replicated Setup>Save to Removable Media**. Follow the instructions on the screen to create the configuration diskette.
 5. Power off the workstation to be configured and insert the configuration diskette.
 6. Power on the workstation to be configured.
 7. Press and hold the **F10** key until you enter the Computer Setup (F10) Utility. Press **Enter** to bypass the title screen, if necessary.
 8. Select **File>Replicated Setup>Restore from Removable Media**, and follow the instructions on the screen.
 9. Restart the workstation when the configuration is complete.

Copying to multiple workstations

 **CAUTION:** A setup configuration is model-specific. File system corruption can result if source and target workstations are not the same model. For example, do not copy the setup configuration from one workstation model to another.

This method takes a little longer to prepare the configuration diskette, but copying the configuration to target workstations is significantly faster. To copy to multiple workstations, complete the following steps:

 **NOTE:** A bootable diskette is required for this procedure. If Windows Vista or Windows XP are not available to use to create a bootable diskette, use the method for copying to a single workstation instead (see [Copying to a single workstation on page 33](#)).

1. Create a bootable diskette.
2. Select a setup configuration to copy.
3. Restart the workstation.

4. As soon as the workstation powers on, press and hold the **F10** key until you enter the Computer Setup (F10) Utility. Press **Enter** to bypass the title screen, if necessary.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and press and hold the **F10** key again to access the utility.
5. If you are using a diskette or other storage device, insert it now.
6. Select **File>Replicated Setup>Save to Removable Media**. Follow the instructions on the screen to create the configuration diskette.
7. Download a BIOS utility for replicating setup (repset.exe) and copy it onto the configuration diskette. To obtain this utility, see: http://www.hp.com/support/workstation_swdrivers and enter the model number of the workstation.
8. On the configuration diskette, create an autoexec.bat file containing:
`repset.exe cpqsetup.txt`.
9. Power off the workstation to be configured. Insert the configuration diskette, and power on the workstation. The configuration utility runs automatically.
10. Restart the workstation when the configuration is complete.

Updating and managing software

HP provides several tools for managing and updating software on desktops and workstations—HP Client Manager Software, Altiris Client Management Solutions, System Software Manager, Proactive Change Notification, and Subscriber's Choice.

HP Client Manager Software

HP Client Manager Software (HP CMS) assists HP customers in managing the hardware aspects of their client workstations with features that include:

- Detailed views of hardware inventory for asset management
- PC health check monitoring and diagnostics
- Proactive notification of changes in the hardware environment
- Web-accessible reporting of business-critical details such as machines with thermal warnings, memory alerts, and more
- Remote updating of system software such as device drivers and ROM BIOS
- Remote changing of boot order
- Configuring the system BIOS settings

For more information on the HP Client Manager, see: <http://www.hp.com/go/ssm>.

Altiris Client Management Solutions

HP and Altiris have partnered to provide comprehensive, tightly integrated systems management solutions to reduce the cost of owning HP client PCs. HP Client Manager Software is the foundation for additional Altiris Client Management Solutions that address:

- Inventory and asset management
 - Software license compliance
 - PC tracking and reporting
 - Lease contract and fixing asset tracking
- Deployment and migration
 - Microsoft Windows Vista Business
 - Microsoft Windows XP Professional or Home Edition migration
 - System deployment
 - Personality migrations
- Help desk and problem resolution
 - Managing help desk tickets
 - Remote troubleshooting
 - Remote problem resolution
 - Client disaster recovery
- Software and operations management
 - Ongoing workstation management
 - HP system software deployment
 - Application self-healing

See <http://www.hp.com/go/ssm> for more information about:

- How HP Client Manager Software works
- Which solutions are compatible with your operating system
- How to download a fully-functional, 30-day evaluation version of the Altiris solutions

System Software Manager

System Software Manager (SSM) is a utility that enables you to update system-level software on multiple systems simultaneously. When executed on a PC client system, SSM detects both hardware and software versions, and then updates the appropriate software from a central repository, also known as a file store. Driver versions that are supported by SSM are denoted with a special icon on the software, the driver download Web site, and on the Support Software CD. To download the utility or to obtain more information on SSM, see: <http://www.hp.com/go/ssm>.

Proactive Change Notification

The Proactive Change Notification program uses the Subscriber's Choice Web site to proactively and automatically:

- Send you Proactive Change Notification (PCN) emails informing you of hardware and software changes to most commercial workstations and servers, up to 60 days in advance
- Send you emails containing customer bulletins, customer advisories, customer notes, bulletins, and driver alerts for most commercial workstations and servers

Subscriber's Choice

Subscriber's Choice is a client-based service from HP. Based on your profile, HP will supply you with personalized product tips, feature articles, and driver and support alerts and notifications. Subscriber's Choice Driver and Support Alerts/Notifications will deliver emails notifying you that the information you subscribed to in your profile is available for review and retrieval. To learn more about Subscriber's Choice and create a custom profile, see: <http://www.hp.com/go/subscriberschoice>.

ROM Flash

The workstation comes with a programmable flash ROM. By establishing a setup password in the Computer Setup (F10) Utility, you can protect the ROM from being unintentionally updated or overwritten. This is important to ensure the operating integrity of the workstation. To upgrade the ROM, download the latest SoftPaq images from http://www.hp.com/support/workstation_swdrivers.

 **NOTE:** For maximum ROM protection, be sure to establish a setup password. The setup password prevents unauthorized ROM upgrades. System Software Manager enables you to set the setup password on one or more PCs simultaneously. For more information, see: <http://www.hp.com/go/ssm>.

Remote ROM Flash

Remote ROM Flash allows the system administrator to safely upgrade the ROM on remote HP workstations directly from the centralized network management console, resulting in a consistent deployment of and greater control over HP PC ROM images over the network. It also results in greater productivity and lower total cost of ownership.

The workstation must be powered on, or turned on through Remote Wakeup, to use Remote ROM Flash.

For more information on Remote ROM Flash, see the HP Client Manager Software or System Software Manager sections at <http://www.hp.com/go/ssm>.

HPQFlash

The HPQFlash utility is used to locally update or restore the system ROM on individual PCs through a Windows operating system.

For more information on HPQFlash, see: <http://www.hp.com/go/ssm> and enter the name of the workstation when prompted.

The FailSafe Boot Block ROM

The FailSafe Boot Block ROM is a flash-protected section of the workstation ROM that checks for a valid system ROM flash image whenever power is applied to the workstation. This protected section of ROM allows the workstation to recover following an unlikely ROM flash failure (such that as caused by a workstation power loss) during a ROM upgrade.

When power is applied to the workstation, the FailSafe Boot Block ROM performs a validation of the system ROM, and:

- If the system ROM is valid, the workstation starts normally.
- If the system ROM fails the validation, the FailSafe Boot Block ROM provides enough support to start the workstation from a BIOS CD or USB storage media image created from a SoftPaq. To accomplish this recovery, the CD or USB media BIOS image programs the system ROM with a valid flash image.

When power is applied to the workstation and the FailSafe Boot Block validation detects an invalid system ROM image, the workstation power LED blinks red eight times with a simultaneous audible beep. The workstation then looks for CD or USB media that contains a valid flash image. If no valid recovery image is found, a Boot Block recovery mode message to that effect is sent to the display. If a valid recovery media and flash image are found, the workstation flashes the system ROM with the valid image and a message to that effect is also sent to the display.

Preparing for validation failure recovery—In preparation for workstation system recovery, use the BIOS CD media file in the SoftPaq to create a BIOS image CD as a recovery backup. You can also use USB media such as an HP DriveKey as the BIOS image recovery media.

To create a BIOS image for recovery backup, see: http://www.hp.com/support/workstation_swdrivers

Recovering from a boot block validation failure—To recover the system ROM after it enters Boot Block recovery mode:

1. Remove all diskette and CD media from workstation drives.
2. Insert a BIOS image recovery CD or USB storage media (such as an HP DriveKey) into the appropriate drive or connector.
3. Power off, then power on the workstation.

If no BIOS image CD or USB media is found after the simultaneous eight red LED flashes and beeps, you are prompted to insert one and to restart the workstation. When a valid recovery image is found, the system ROM will flash that image.

 **NOTE:** During system ROM recovery, the system ROM will flash without asking for a setup or power on password. However, following a successful recovery flash and workstation reboot, previously set passwords will remain active and are required.

4. Remove the recovery CD or USB media and power off the system.
5. Restart the workstation and resume normal operation.

Asset tracking and security

Asset tracking features incorporated into the workstation provide key asset tracking data that can be managed using HP Systems Insight Manager, HP Client Manager Software, or other system management applications. Seamless, automatic integration between asset tracking features and these products enables you to choose the management tool that is best suited to the environment and to leverage the investment in existing tools.

HP also offers several solutions for controlling access to valuable components and information. ProtectTools Embedded Security, if installed, prevents unauthorized access to data and checks system integrity and authenticates third-party users attempting system access. Security features such as ProtectTools and the optional Hood Sensor (Smart Cover Sensor) help prevent unauthorized access to your data and to the internal components of the workstation. By disabling serial or USB ports or by disabling removable media boot capability, you can protect valuable data assets. Memory Change and

Hood Sensor (Smart Cover Sensor) alerts can be automatically forwarded to system management applications to deliver proactive notification of tampering with a workstation's internal components.

-  **NOTE:** ProtectTools, the Hood Sensor (Smart Cover Sensor), and the Hood Lock (Smart Cover Lock) are available as options on select systems.

Use the following utilities to manage security settings on the HP workstation:

- Locally, using the Computer Setup (F10) Utility.
- Remotely, using HP Client Manager Software or System Software Manager. This software enables the secure, consistent deployment and control of security settings from a simple command line utility.

The following table and sections refer to managing security features of the workstation locally through the Computer Setup (F10) Utility.

Table 3-2 Security Features Overview

Feature	Purpose	How it is established
Removable Media Boot Control	Prevents booting from the removable media drives.	From the Computer Setup (F10) Utility menu.
Serial, USB, or Infrared Interface Control	Prevents transfer of data through the integrated serial, USB, or infrared interface.	From the Computer Setup (F10) Utility menu.
Power-On Password	Prevents use of the workstation until the password is entered. This can apply to both initial system startup and restarts.	From the Computer Setup (F10) Utility menu.
Setup Password	Prevents reconfiguration of the workstation (use of the Setup Utilities) until the password is entered.	From the Computer Setup (F10) Utility menu.
Network Server Mode	Provides unique security features for workstations being used as servers.	From the Computer Setup (F10) Utility menu.

For more information about the Computer Setup (F10) Utility, see [Computer Setup \(F10\) Utility menu on page 27](#).

Password security

The power-on password prevents unauthorized use of the workstation by requiring entry of a password to access applications or data each time the workstation is powered on or restarted. The setup password specifically prevents unauthorized access to the Computer Setup (F10) Utility and can also be used as an override to the power-on password. That is, when prompted for the power-on password, entering the setup password instead will enable access to the workstation.

You can establish a network-wide setup password to enable the system administrator to log in to all network systems to perform maintenance without having to know the power-on password.

-  **NOTE:** System Software Manager and HP Client Manager Software enable remote management of Setup Passwords and other BIOS settings in a networked environment. For more information, see: <http://www.hp.com/go/easydeploy>.

Establishing a setup password using the Computer Setup (F10) Utility

Establishing a setup password through the Computer Setup (F10) Utility prevents reconfiguration of the workstation (via use of the Computer Setup (F10) Utility) until the password is entered.

To establish a setup password using workstation setup:

1. Power on or restart the workstation.
2. As soon as the computer is powered on, press and hold the **F10** key until you enter the Computer Setup (F10) Utility. Press **Enter** to bypass the title screen, if necessary.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and press and hold the **F10** key again to access the utility.
3. Select **Security>Setup Password** and follow the onscreen instructions.
4. Before exiting, select **File>Save Changes** and **Exit**.

Establishing a power-on password using workstation setup

Establishing a power-on password through the Computer Setup (F10) Utility prevents access to the workstation when power is connected, unless the password is entered. When a power-on password is set, the Computer Setup (F10) Utility presents Password Options under the Security menu. The password options include Network Server Mode and Password Prompt on Warm Boot.

When Network Server Mode is disabled, the password must be entered each time the workstation is powered on when the key icon appears on the monitor. When Password Prompt on Warm Boot is enabled, the password must also be entered each time the workstation is rebooted. When Network Server Mode is enabled, the password prompt is not presented during POST.

To enable Network Server Mode, a power-on password must be set. The option is available under **Advanced>Password Options**. This option enables the system to boot without asking for the power-on password, but the keyboard and mouse are locked until you enter it. The keyboard LEDs rotate constantly when the system is in locked mode.

To establish a power-on password through workstation setup:

1. Power on or restart the workstation.
2. As soon as the computer is powered on, press and hold the **F10** key until you enter the Computer Setup (F10) Utility. Press **Enter** to bypass the title screen, if necessary.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and press and hold the **F10** key again to access the utility.
3. Select **Security>Power-On Password** and follow the onscreen instructions.
4. Before exiting, select **File>Save Changes** and **Exit**.

Entering a power-on password

1. Restart the workstation.
2. When the key icon appears on the monitor, enter the current password, and press **Enter**.

 **NOTE:** Type carefully. For security reasons, the characters you enter do not appear on the screen.

If you enter the password incorrectly, a broken key icon appears. Try again. After three unsuccessful tries, you must restart the workstation before you can continue.

Entering a Setup Password

If a setup password has been established on the workstation, you will be prompted to enter it each time you run the Computer Setup (F10) Utility.

To enter a setup password:

1. Restart the workstation.
2. As soon as the workstation is powered on, press and hold the **F10** key until you enter the Computer Setup (F10) Utility. Press **Enter** to bypass the title screen, if necessary.
NOTE: If you do not press the **F10** key at the appropriate time, you must restart the workstation and press and hold the **F10** key again to access the utility.
3. When the key icon appears on the monitor, enter the setup password, and press **Enter**.

NOTE: Type carefully. For security reasons, the characters you enter do not appear on the screen.

If you enter the password incorrectly, a broken key icon appears. Try again. After three unsuccessful tries, you must restart the workstation before you can continue.

Changing a power-on or setup password

1. Restart the workstation.
2. To change the Setup password, as soon as the workstation is turned on, press and hold the **F10** key until you enter the Computer Setup (F10) Utility. Press **Enter** to bypass the title screen, if necessary.
NOTE: If you do not press **F10** at the appropriate time, you must restart the workstation and press and hold the **F10** key again to access the utility.
3. When the key icon appears, enter the current password, a slash (/) or alternate delimiter character, your new password, another slash (/) or alternate delimiter character, and your new password again as shown: **current password/new password/new password**
NOTE: Type carefully. For security reasons, the characters you enter do not appear on the screen.
4. Press **Enter**.

The new password takes effect the next time you power on the workstation.

NOTE: Refer to [National keyboard delimiter characters on page 41](#) for information about the alternate delimiter characters. The power-on password and setup password can also be changed using the Security options in the Computer Setup (F10) Utility.

Deleting a power-on or setup password

1. Power on or restart the workstation.
2. To delete the power-on password, go to step 3. To delete the Setup Password, as soon as the workstation is powered on, press and hold the **F10** key until you enter the Computer Setup (F10) Utility. Press **Enter** to bypass the title screen, if necessary.
NOTE: If you do not press the **F10** key at the appropriate time, you must restart the computer and press and hold the **F10** key again to access the utility.
Use the appropriate operating system shutdown process. To delete the setup password, run the Computer Setup (F10) Utility.
3. When the key icon appears, enter your current password followed by a slash (/) or alternate delimiter character as shown: **current password/**
4. Press **Enter**.

 **NOTE:** Refer to [National keyboard delimiter characters on page 41](#) for information about the alternate delimiter characters. The power-on password and setup password can also be changed using the Security options in the Computer Setup (F10) Utility.

National keyboard delimiter characters

Each keyboard is designed to meet country-specific requirements. The syntax and keys that you use for changing or deleting your password depend on the keyboard that came with your workstation.

Table 3-3 National keyboard delimiter characters

Language	Delimiter	Language	Delimiter	Language	Delimiter
Arabic	/	Greek	-	Russian	/
Belgian	=	Hebrew	.	Slovakian	-
BHCSY*	-	Hungarian	-	Spanish	-
Brazilian	/	Italian	-	Swedish/Finnish	/
Chinese	/	Japanese	/	Swiss	-
Czech	-	Korean	/	Taiwanese	/
Danish	-	Latin American	-	Thai	/
French	!	Norwegian	-	Turkish	.
French Canadian	é	Polish	-	U.K. English	/
German	-	Portuguese	-	U.S. English	/

* For Bosnia-Herzegovina, Croatia, Slovenia, and Yugoslavia.

Clearing passwords

If you forget your password, you cannot access the workstation. Refer to the section on resetting the password jumper for instructions on clearing passwords.

The DriveLock security feature

 **CAUTION:** The DriveLock security feature can render a hard drive permanently inaccessible if the master password is lost or forgotten. No method exists to recover the password or access the data.

DriveLock uses an industry-standard security feature that prevents unauthorized access to the data on an ATA hard drive. DriveLock has been implemented as an extension to the Computer Setup (F10) Utility functions. It is only available when hard drives that support the ATA security command set are detected. On HP workstations, it is not available when the SATA emulation mode is RAID+AHCI or RAID.

DriveLock is intended for HP customers for whom data security is a paramount concern. For such customers, the cost of a hard drive and the loss of the data stored on it is inconsequential when compared to the damage that could result from unauthorized access to its contents.

In order to balance this level of security with the practical need to address the issue of a forgotten password, the HP implementation of DriveLock employs a two-password security scheme. One password is intended to be set and used by a system administrator, while the other is typically set and used by the end-user. There is no "back door" that can be used to unlock the drive if both passwords are lost. Therefore, DriveLock is most safely used when the data contained on the hard drive is replicated on a corporate information system or is regularly backed up. In the event that both DriveLock passwords

are lost, the hard drive is rendered unusable. For users who do not fit the previously defined customer profile, this may be an unacceptable risk. For users who do fit this profile, it may be a tolerable risk, given the nature of the data stored on the hard drive.

DriveLock applications

The most practical use of the DriveLock security feature is in a corporate environment. The system administrator would be responsible for configuring the hard drive, which involves setting the DriveLock master password and a temporary user password. In the event that the user forgets the user password or the equipment is passed on to another employee, the master password can always be used to reset the user password and regain access to the hard drive.

HP recommends that corporate system administrators who choose to enable DriveLock also establish a corporate policy for setting and maintaining master passwords. This should be done to prevent a situation where an employee intentionally or unintentionally sets both DriveLock passwords before leaving the company. In such a scenario, the hard drive is rendered unusable and requires replacement. Likewise, by not setting a master password, system administrators might find themselves locked out of a hard drive and unable to perform routine checks for unauthorized software, other asset control functions, and support.

For users with less stringent security requirements, HP does not recommend enabling DriveLock. Users in this category include personal users, or users who do not maintain sensitive data on their hard drives as a common practice. For these users, the potential loss of a hard drive resulting from forgetting both passwords is much greater than the value of the data DriveLock has been designed to protect.

Access to the Computer Setup (F10) Utility and DriveLock can be restricted through the setup password. By specifying a setup password and not giving it to end users, system administrators are able to restrict users from enabling DriveLock.

Using DriveLock

When one or more hard drives that support the ATA security command set are detected, the DriveLock option appears under the Security menu in the Computer Setup (F10) Utility. You are presented with options to set the master password and to enable DriveLock. A user password must be provided to enable DriveLock. Since the initial configuration of DriveLock is typically performed by a system administrator, a master password should be set first. HP encourages system administrators to set a master password whether they plan to enable DriveLock or not. This gives the administrator the ability to modify DriveLock settings if the drive is locked in the future. Once the master password is set, the system administrator might enable DriveLock or choose to leave it disabled.

If a locked hard drive is present, POST requires a password to unlock the device. If a power-on password is set and it matches the device's user password, POST does not prompt the user to re-enter the password. Otherwise, the user is prompted to enter a DriveLock password. For a cold-boot, use the master or user password. For a warm-boot, you must enter the same password used to unlock the drive during the preceding cold-boot. Users are given two attempts to enter a correct password. During cold-boot, if neither attempt succeeds, POST continues but the drive remains inaccessible. During a warm-boot or restart from Windows, if neither attempt succeeds, POST halts and the user is instructed to cycle power.

To enable and set the DriveLock user password:

1. Power on or restart the workstation.
2. As soon as the workstation is powered on, press and hold the **F10** key until you enter the Computer Setup (F10) Utility. Press **Enter** to bypass the title screen, if necessary.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation, and then press and hold the **F10** key again to access the utility.

3. Select **Security>DriveLock Security**.
 4. For each DriveLock-capable drive, select a drive by pressing the **F10** key to accept.
 5. Under Enable/Disable DriveLock options, select **Enable**, and then press the **F10** key to enable DriveLock for a particular drive.
-
-  **CAUTION:** Forgetting the DriveLock password renders the drive unusable.
6. Enter a new user password, and then press the **F10** key to accept. This password can contain anywhere from one to 32 characters.
 7. Enter the password again in the Enter New Password Again field. If you forget this password, the drive is rendered permanently disabled.
 8. Select **File>Save Changes and Exit**, and then press the **F10** key. After you press the **F10** key, the system performs a cold-boot before invoking the DriveLock function.

 **NOTE:** This process can also be used to set the DriveLock master password by selecting **Master** in Step 5.

When the workstation starts, you are prompted to enter the DriveLock password for each DriveLock-capable drive for which you have previously set a password. You are given two attempts to enter the password correctly. If the password is not entered correctly, the workstation attempts to boot anyway. However, the boot process most likely fails because data from a locked drive cannot be accessed.

You can configure your workstation to boot either with or without DriveLock enabled for the boot drive as follows:

- In a single drive workstation, if the drive is DriveLock enabled, the workstation might not be able to boot to the operating system, and might try to boot from the network or from another storage device instead (depending on the boot ordering options). Regardless of the outcome of the boot attempts, the drive-locked drive remains inaccessible without the DriveLock password.
- In a two-drive workstation that has a boot drive and a data drive, you can apply the DriveLock feature to the data drive only. In this case, the workstation can always boot without the DriveLock password, but the data drive is accessible only when the DriveLock password is entered.

Cold-boots require that you enter DriveLock passwords. However, DriveLock passwords are also required for warm-boots. For example, if you boot to DOS and enter **Ctrl+Alt+Del**, you must enter the DriveLock password before the workstation completes the next boot cycle. This warm-boot behavior is consistent with the DriveLock feature.

Hood sensor option (smart cover sensor)

The optional hood sensor is a combination of hardware and software technology that can alert you when the workstation side access panel has been removed if the sensor has been properly configured in the Computer Setup (F10) Utility. There are three levels of protection, as described in the following table.

Table 3-4 Hood Sensor Protection Levels

Level	Setting	Description
Level 0	Disabled	Hood sensor is disabled (default).
Level 1	Notify User	When the workstation restarts, the screen displays a message indicating that the workstation side access panel has been removed.
Level 2	Setup Password	When the workstation is restarted, the screen displays a message indicating that the workstation side access panel has been removed. You must enter the setup password to continue.

These settings can be changed using the Computer Setup (F10) Utility.

Setting the hood sensor protection level

1. Power on or restart the workstation.
2. As soon as the workstation is powered on, press and hold the **F10** key until you enter the Computer Setup (F10) Utility. Press **Enter** to bypass the title screen, if necessary.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the computer and press and hold the **F10** key again to access the utility.
3. Select **Security>Smart Cover>Cover Removal Sensor**, and follow the onscreen instructions.
4. Before exiting, select **File>Save Changes and Exit**.

Hood lock (smart cover lock)

The hood lock is a solenoid that secures the workstation access cover to the chassis. It is controlled by a password in the BIOS. When installed, the hood lock can prevent unauthorized access to the internal components.

-  **CAUTION:** For maximum cover lock security, be sure to establish a setup password. The setup password prevents unauthorized access to the Computer Setup (F10) Utility.
-

Locking the solenoid lock

1. Power on or restart the workstation.
2. As soon as the workstation is powered on, press and hold the **F10** key until you enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and press and hold the **F10** key again to access the utility. If you are using a PS2 keyboard, you might see a Keyboard Error message—disregard it.
3. Select **Security>Smart Cover>Cover Lock>Lock**.
4. Select **File>Save Changes and Exit**.

Unlocking the solenoid lock

1. Power on or restart the workstation.
2. As soon as the workstation is powered on, press and hold the **F10** key until you enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.

 **NOTE:** If you do not press the **F10** key at the appropriate time, you must restart the workstation and press and hold the **F10** key again to access the utility. If you are using a PS2 keyboard, you might see a Keyboard Error message—disregard it.
3. Select **Security>Smart Cover>Cover Lock>Unlock**.
4. Select **File>Save Changes and Exit**.

Using a FailSafe key

If you enable the hood lock, your will need a FailSafe Key in order to open the workstation side access panel under the following conditions:

- Power outage
- Startup failure

- PC component failure (such as processor or power supply)
- Forgotten password

 **NOTE:** The FailSafe Key is a workstation accessory that must be ordered from HP. Be prepared; order this key before you actually need it.

You can order a FailSafe Key in either of the two following key configurations:

- Smart Cover FailSafe Key, tamper-resistant T-15 wrench
- Smart Cover FailSafe Key, tamper-resistant screwdriver bit.

To determine the correct HP part number for each key configuration, see <http://partsurfer.hp.com>.

To obtain the FailSafe Key, contact HP post sales support by telephone or online:

- HP post sales support telephone: 1-800-hp-invent
- HP post sales support Web site: http://welcome.hp.com/country/us/en/wwcontact_us.html

Clearing Passwords

If you forget your password, you cannot access the workstation. Refer to the section on resetting the password jumper in the appendix.

Cable lock provision (optional)

The rear panel of the chassis can accommodate a cable lock accessory that allows the workstation to be physically secured to a work area.

Security lock (optional)

The security lock prevents entire system theft and discourages access panel removal.

Hood lock (Smart cover lock) (optional)

Prevents removal of the access panel and all internal components including optical and diskette drives. This lock eliminates the need for a physical key by enabling password-protected locking and locking by a local or a remote user.

Hood sensor (Smart cover sensor) (optional)

This sensor is set in the Computer Setup (F10) Utility. You can set this to notify a user if the access panel has been removed.

Fault notification and recovery

Fault notification and recovery features combine innovative hardware and software technology to prevent the loss of critical data and minimize unplanned downtime.

If the workstation is connected to a network managed by HP Client Manager Software, the computer sends a fault notice to the network management application. With HP Client Manager Software, you can also remotely schedule diagnostics to automatically run on all managed PCs and create a summary report of failed tests.

Drive Protection System

The Drive Protection System (DPS) is a diagnostic tool built into the hard drives that is installed in select HP workstations. The DPS is designed to help diagnose problems that might result in unwarranted hard drive replacement.

When HP workstations are built, each installed hard drive is tested using the DPS, and a permanent record of key information is written onto the drive. Each time the DPS is run, test results are written to the hard drive. The service provider can use this information to help diagnose conditions that caused you to run the DPS software.

ECC fault prediction and prefailure warranty

When the workstation encounters an excessive number of error checking and correcting (ECC) memory errors, the workstation displays a Local Alert message. This message contains detailed information about the errant memory module, enabling you to take action before you experience non-correctable memory errors. The Prefailure Warranty for ECC memory modules enables you to replace these modules, free of charge, before the modules actually fail. ECC memory modules are optional on selected HP workstations.

Thermal sensor

There are multiple sensors on your workstation:

- One for the processor
- One for the system board
- Some hard drives

The processor thermal sensor monitors the processor core temperature, while the board thermal sensor monitors the internal temperature of the workstation. These sensors control the speed of the workstation cooling fans as the processor and internal workstation temperatures increase and decrease.

The cooling system is designed to provide maximum thermal dissipation for a fully configured workstation, which ensures that the processor and all system components do not exceed safe operating temperatures. If the maximum force of the cooling fans cannot adequately cool the processor, the processor clock automatically begins to slow. If the temperature remains above limits even with reduced processor clock speed, the system eventually shuts down.

Dual-State Power Button

With ACPI enabled, the power button can function either as an on/off switch or as a button. The feature does not completely turn off power, but instead causes the workstation to enter a low-power standby state. This allows you to power down without closing applications and to return to the same operational state without any data loss.

To change the power button configuration:

1. Select **Start**, and select **Control Panel>Power Options**.
2. In **Power Options Properties**, select the **Advanced** tab.
3. In the **Power Button** section, select **Hibernate**. (Hibernate must be enabled in the **Hibernate** tab.)

After configuring the power button to function as a button, press the power button to put the system in a very low power state. Press the button again to bring the system out of the very low power state to full power status. To completely turn off all power to the system, press and hold the power button for four seconds.

-
- △ **CAUTION:** Do not use the power button to power off the workstation unless the system is not responding; turning off the power without operating system interaction could cause damage to or loss of data on the hard drive.
-

4 Removal and replacement procedures

This chapter describes removal and replacement procedures of most internal components of the workstation, and includes the following sections:

- [Warnings and cautions on page 49](#)
- [Service considerations on page 50](#)
- [Customer Self-Repair on page 55](#)
- [Predisassembly procedures on page 55](#)
- [System board components on page 56](#)
- [Steps for removing and replacing components on page 57](#)
- [Product recycling on page 96](#)

Warnings and cautions

- ⚠ **WARNING!**  Any surface or area of the equipment marked with this symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists. To reduce the risk of injury from a hot component, enable the surface to cool before touching.
- ⚠ **WARNING!**  Any surface or area of the equipment marked with this symbol indicates the presence of an electrical shock hazard. To reduce the risk of injury from electrical shock, do not open any enclosed area marked with this symbol.
- ⚠ **WARNING!** To reduce the risk of electric shock or damage to your equipment:
 - Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord in a grounded (earthed) outlet that is easily accessible at all times.
 - Disconnect power from the equipment by unplugging the power cord from the electrical outlet.
- ⚠ **WARNING!** To reduce the risk of serious injury, read the *Safety & Comfort Guide*. It describes proper workstation setup, posture, health, and work habits for computer users, and provides important electrical and mechanical safety information. This guide is located at <http://www.hp.com/ergo> and on the documentation CD (if one is included with the product).
- ⚠ **WARNING!** If a product is shipped in packaging marked with this symbol, , the product must always be lifted by two persons to avoid personal injury due to product weight.
- ⚠ **CAUTION:** Static electricity can damage the electronic components of the workstation. Before beginning these procedures, be sure you discharge static electricity by briefly touching a grounded metal object.

-
- △ **CAUTION:** Observe the following cautions when removing or replacing a processor:
- Installing a processor incorrectly can damage the system board. Contact an HP authorized reseller or service provider to install the processor. If you plan to install the processor yourself, read all of the instructions carefully before you begin.
 - Failure to follow the workstation preparation instructions can result in an improperly installed processor, causing extensive workstation damage.
 - Processor socket pins are delicate and bend easily. Use extreme care when placing the processor in the socket.
-
- △ **CAUTION:** To prevent damage to the workstation, observe the following Electrostatic Discharge (ESD) precautions while performing the system parts removal and replacement procedures:
- Work on a static-free mat.
 - Wear a static strap to ensure that any accumulated electrostatic charge is discharged from your body to the ground.
 - Create a common ground for the equipment you are working on by connecting the static-free mat, static strap, and peripheral units to that piece of equipment.
-
-  **NOTE:** HP accessories are for use in HP Workstation products. They have been extensively tested for reliability and are manufactured to high quality standards.

Service considerations

The following sections discuss service considerations that should be reviewed and practiced before removing and replacing any system components.

-
- ⚠ **WARNING!** When lifting or moving the workstation, do not use the front bezel as a handle or lifting point. Lifting the workstation from the front bezel or lifting it incorrectly can cause the unit to fall and harm you and damage the workstation. To properly and safely lift the workstation, lift it from the bottom of the unit.

Cautions, warnings, and safety precautions

For your safety, review the cautions, warnings, and safety precautions before accessing the workstation components. Also, review the *Safety and Regulatory Guide* that came with your workstation for more information.

Electrostatic discharge information

A sudden discharge of static electricity from your finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) might not appear to be affected at all and can function normally for a while, but it has been degraded in the internal layers, reducing its life expectancy.

Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.

Generating static electricity

The following table shows that different activities generate different amounts of static electricity. Static electricity increases as humidity decreases.

Table 4-1 Static electricity

Event	Relative humidity		
	55%	40%	10%
Walking across carpet	7,500V	15,000V	35,000V
Walking across vinyl floor	3,000V	5,000V	12,000V
Motions of bench worker	400V	800V	6,000V
Removing bubble pack from PCB	7,000V	20,000V	26,500V
Packing PCBs in foam-lined box	5,000V	11,000V	21,000V

NOTE: 700 volts can degrade a product.

Preventing electrostatic damage to equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following packaging and grounding precautions are necessary to prevent damage to electric components and accessories.

- Transport products in static-safe containers, such as tubes, bags, or boxes, to avoid hand contact.
- Protect all electrostatic parts and assemblies with approved non-conductive containers or packaging.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Place items on a grounded surface before removing them from their containers.
- When handling or touching a sensitive component or assembly, ground yourself by touching the chassis.
- Avoid contact with pins, leads, or circuitry.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or non-conductive foam.

Personal grounding methods and equipment

Use the following equipment to prevent static electricity damage to equipment:

- Wrist straps are flexible straps with a maximum of one megohm \pm 10% resistance in the ground cords. To provide a proper ground, wear the strap against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.
- Heel straps, toe straps, and boot straps can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a maximum of one-megohm \pm 10% resistance between the operator and ground.

Table 4-2 Static shielding protection levels

Method	Voltage
Antistatic plastic	1,500
Carbon-loaded plastic	7,500
Metallized laminate	15,000

Grounding the work area

To prevent static damage at the work area:

- Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Use static-dissipative mats, foot straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.
- Disconnect power and input signals before inserting and removing connectors or test equipment
- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of non-conductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

Recommended materials and equipment

Materials and equipment that are recommended for use in preventing static electricity include:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of one-megohm \pm 10% resistance
- Static-dissipative table or floor mats with hard tie to ground
- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing one-megohm \pm 10% resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

Tools and software requirements

- Torx T-15 screwdriver or flatblade screwdriver
- Phillips screwdriver
- Diagnostics software

Screws

The screws used in the workstation are not interchangeable. They might have standard or metric threads and might be of different lengths. If an incorrect screw is used during the reassembly process, it can damage the unit. Hewlett-Packard strongly recommends that all screws removed during disassembly be kept with the removed part, and then returned to their proper locations.

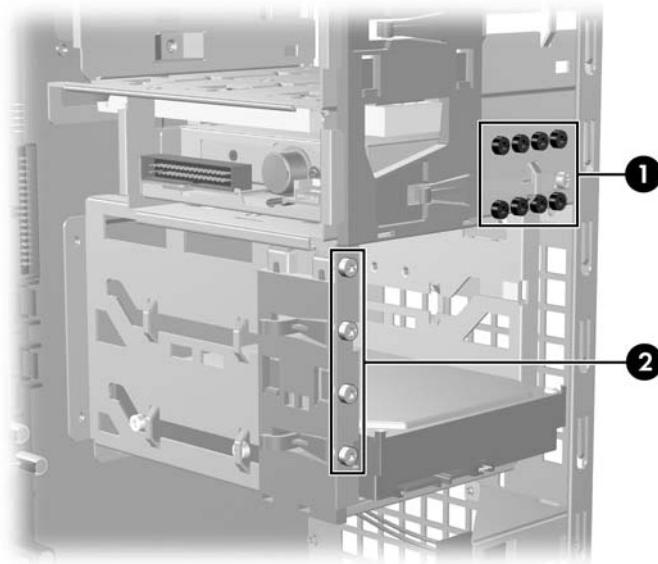
 **NOTE:** Metric screws have a black finish. American National Standards Institute (ANSI) screws have a silver finish.

As each subassembly is removed from the workstation, place the subassembly away from the work area to prevent damage.

If necessary, additional drive guide screws are provided on the system chassis. There are eight Metric screws (1), as shown in the following figure, located on the chassis near the 5.25-inch optical drive bays. These screws can be used to mount additional optical drives or an optional diskette drive. There are four ANSI screws (2), as shown in the following figure, located on the chassis near the hard drive. These screws can be used to mount additional hard drives in the 3.5" hard drive cage.

 **NOTE:** Metric (black) and ANSI (silver) screws are not interchangeable.

Figure 4-1 Metric and ANSI screw identification



1 Metric screws

Used for optical and diskette drives.

2 ANSI screws

Used for hard drives.

Special handling of components

The following components require special handling when servicing the workstation.

 **WARNING!** Do not use the front bezel as a handle or lifting point when lifting or moving the workstation. Lifting the workstation from the front bezel or lifting it incorrectly could cause the unit to fall, causing you harm and damaging the workstation. To properly and safely lift the workstation, lift it from the bottom of the chassis for either the desktop or minitower configuration.

Cables and connectors

Cables must be handled with care to avoid damage. Apply only the tension required to seat or unseat the cables during insertion or removal from the connector. Handle cables by the connector or pull strap whenever possible. In all cases, avoid bending or twisting the cables, and ensure that the cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced.

 **CAUTION:** When servicing this workstation, be sure that cables are placed in their proper location during the reassembly process. Improper cable placement can damage the workstation.

Hard drives

Handle hard drives as delicate, precision components, and avoid all physical shock and vibration. This guideline applies to failed drives as well as replacement spares.

- If a drive must be mailed, place the drive in a bubble-pack mailer or other suitable protective packaging and label the package "Fragile: Handle With Care."
- Do not remove new or replacement hard drives from the shipping package for storage. Keep hard drives in their protective packaging until they are actually mounted in the workstation.
- Avoid dropping drives from any height onto any surface.
- Power off the workstation before removing a hard drive. Do not remove a hard drive while the workstation is on or in standby mode.
- Ensure that you are discharged of static electricity before handling a drive. While handling a drive, avoid touching the data connector.

 **CAUTION:** To prevent possible damage from static electricity from in the drive being installed, always connect the drive power cable before connecting the data cable. This will discharge any accumulated static electricity through the drive power cable to the workstation chassis.

For more information about preventing electrostatic damage, see [Electrostatic discharge information on page 50](#).

- Do not use excessive force when inserting a drive.
- Avoid exposing a hard drive to liquids, temperature extremes, or products that have magnetic fields such as monitors or speakers.

Lithium coin cell battery

The workstation battery provides power to the real-time clock and has a minimum lifetime of approximately three years.

For instructions on battery removal and replacement, see the [Battery on page 87](#) section of this chapter.

 **WARNING!** This workstation contains a lithium battery. There is a risk of fire and chemical burn if the battery is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose of in water or fire, or expose it to temperatures higher than 140° Fahrenheit (60° Centigrade).

 **NOTE:** Batteries, battery packs, and accumulators should not be disposed of with general household waste.

Customer Self-Repair

Customer Self-Repair enables you to obtain replacement parts and install them yourself on your workstation. See <http://www.hp.com/go/selfrepair> for more information.

Predisassembly procedures

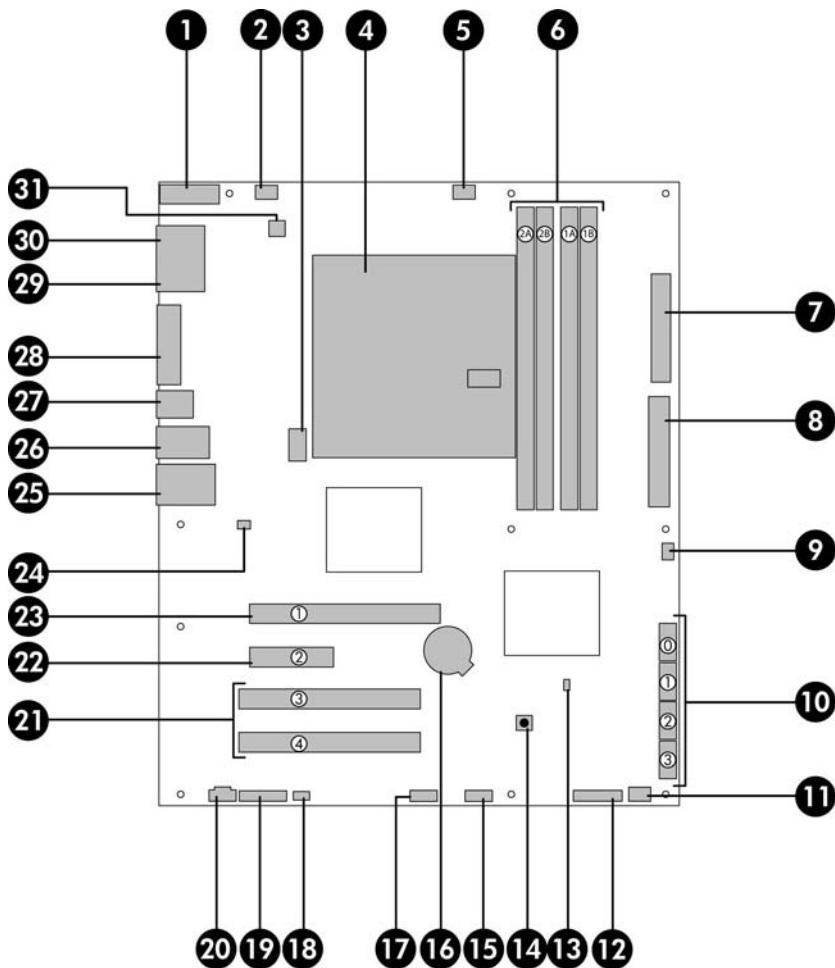
Perform the following steps before servicing the workstation:

- 1.** Close any open software applications.
- 2.** Remove any diskettes or CDs from the workstation.
- 3.** Shut down the operating system.
- 4.** Power off the workstation and any peripheral devices that are connected to it.
- 5.** Remove or disengage any security devices that prohibit opening the workstation.
- 6.** Disconnect the power cord from the electrical outlet and from the workstation.
- 7.** Disconnect all peripheral device cables from the workstation.

System board components

The following illustration shows the system board connectors, sockets, and important switches for the HP xw4550 Workstation.

Figure 4-2 System board component identification



NOTE: In the following table, component names are shown as they appear on the system board.

Table 4-3 System board components

No.	Component	No.	Component	No.	Component
1	COM2 (second) serial port adapter	12	CONTROL PANEL (Front control panel) connector	23	SLOT1_PCIE (PCI-express) x16 card slot
2	SYS_FAN (rear chassis fan) connector	13	Password Enable jumper	24	Hood Lock (solenoid hood lock) connector
3	Graphics card power connector	14	Clear CMOS switch	25	Network and USB connectors
4	CPU (processor)	15	FRONT USB connector	26	USB connectors
5	CPU_FAN (processor fan) connector	16	Battery	27	Audio connector

Table 4-3 System board components (continued)

No.	Component	No.	Component	No.	Component
6	Memory module sockets	17	INTERNAL USB connector	28	DVI-D integrated video connector
7	Floppy (diskette) drive connector	18	SPK (speaker) connector	29	Serial port (top) connector
8	Power Connector P1 (main power to system board)	19	FRONT AUDIO connector	30	VGA (bottom) connector
9	HOOD SENSE (optional chassis intrusion switch) connector	20	AUX_IN (auxiliary) audio connector	31	Power Connector (processor power) connector
10	SATA (SATA0 – SATA3) port connectors	21	SLOT3 & SLOT4 PCI 32/33 card slots		
11	PCI FAN (front chassis fan)	22	SLOT2_PCIE (PCI-Express) x4(1) card slot		

Steps for removing and replacing components

This section discusses the procedures necessary to remove and install various hardware components on your workstation. Review the safety and precautions and the [Service considerations on page 50](#), as well as the *Safety and Regulatory Information*, before servicing or upgrading your system.

Follow these safety and procedural steps when servicing your workstation:

1. Read all safety information and precautions.
2. Locate and clear a suitable work area.
3. Shut down the system and remove power from the unit.
4. Gather your tools.
5. Service your workstation.
6. Restore power to your workstation.

Disassembly order

Use the following table to determine the sequence in which to remove the major components.

Predisassembly ([Predisassembly procedures on page 55](#))

Security lock ([The optional security lock on page 59](#))

Cable lock ([The optional cable lock on page 59](#))

Side access panel ([Side access panel on page 59](#))

Hood sensor ([Optional hood sensor
\(Smart cover sensor\) on page 60](#))

Front bezel ([Front Bezel
on page 62](#))

Bezel blanks ([Bezel blanks
on page 62](#))

Front panel I/O device assembly ([Front
panel I/O device assembly on page 63](#))

Power button and front speaker ([Power
button on page 65](#))

Optical drive ([Optical drive \(minitower
configuration\) on page 66](#))

Diskette drive ([Diskette drive \(optional\)
on page 72](#))

Power supply ([Power supply
on page 74](#))

System fan ([System fan assembly
on page 76](#))

Memory ([Memory
on page 77](#))

PCI retainer ([PCI retainer on page 81](#))

PCI or PCI express card ([PCI
on page 84](#))

Front fan removal (optional) ([Front PCI card guide and
optional fan removal on page 85](#))

Optional IEEE-1394 card ([IEEE-1394 Card \(optional\)
on page 86](#))

Battery ([Battery
on page 87](#))

Hard drive ([SATA hard drive
on page 88](#))

Processor heatsink
([Processor heatsink
on page 92](#))

Processor ([Processor
on page 94](#))

System board ([System
board on page 95](#))

The optional security lock

If a security padlock is installed, remove it before servicing the workstation. To remove the padlock, unlock it and slide it out of the padlock loop as shown in the following image.

Figure 4-3 Removing the security lock



The optional cable lock

If a cable lock is installed, remove it before servicing the workstation. To remove the cable lock, unlock it and pull it out of the cable lock slot as shown in the following image.

Figure 4-4 Removing the cable lock



Side access panel

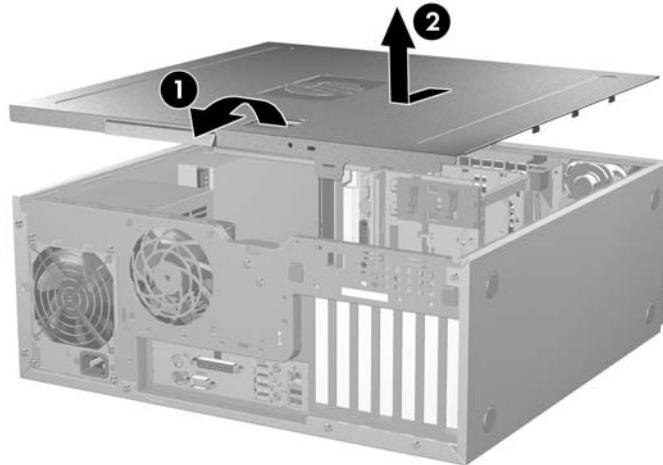
To access the internal components of the workstation, the side access panel first must be removed.

To remove the side access panel:

⚠️ WARNING! Electrical shock hazard. Before removing the workstation side access panel, be sure that the workstation is powered off and that the power cord is disconnected from the electrical outlet.

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and lay the workstation on its side as shown below.
2. If necessary, unlock any locks that are present (security lock, cable lock).
3. Pull up on the latch (1), slide the side access panel toward the rear of the workstation and then lift off the cover (2).

Figure 4-5 Opening the side access panel



To reinstall the side access panel, align the bottom groove of the side access panel with the bottom edge of the chassis, and move the top of the side access panel toward the chassis until the panel aligns with chassis sides. Continue to press firmly until the latch engages.

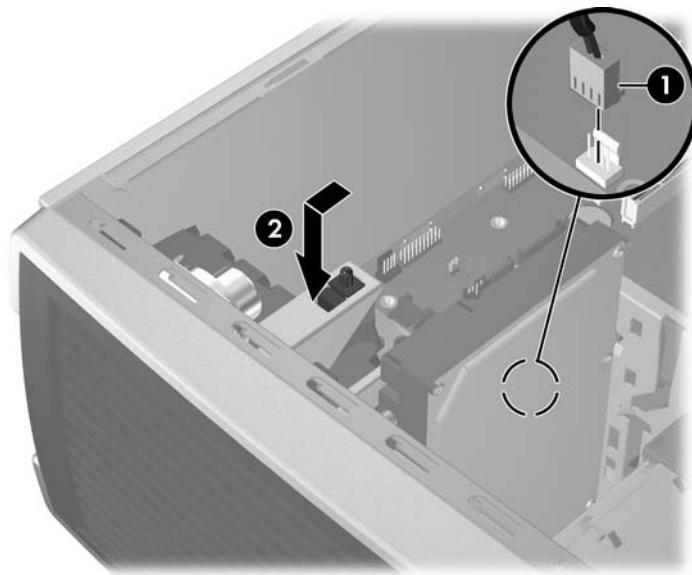
Optional hood sensor (Smart cover sensor)

To remove the optional hood sensor:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).

2. Disconnect the hood sensor connector (1) from system board. The hood sensor system board connector is located between the main power connector (P1) and the SATA Port0 connector on the system board (behind the installed hard drive, as shown in the inset (1) in the figure below).

Figure 4-6 Removing the hood sensor



3. Slide the hood sensor forward, push it down, and remove it (2) from the chassis. .

To replace the hood sensor, reverse the previous steps.

Optional solenoid hood lock (Smart cover lock)

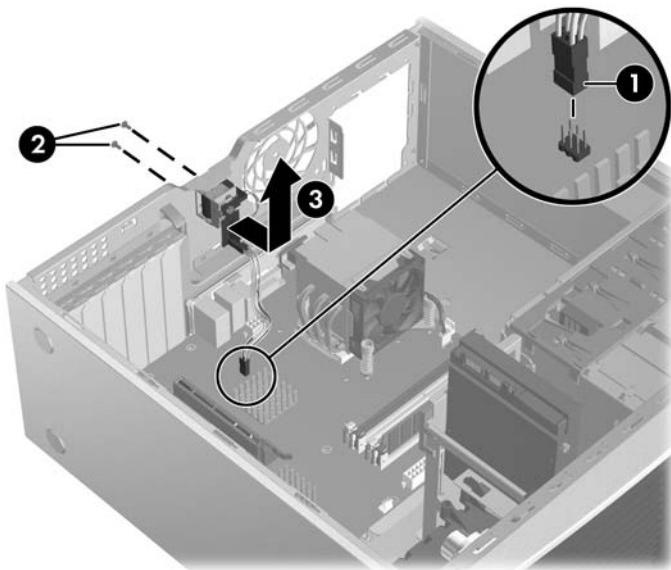
To remove the hood lock:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).
2. Disconnect the solenoid hood lock cable (1) from the system board.
3. Using the FailSafe key (T-15 wrench), remove the two screws (2) from the back of the chassis as shown in the following figure.

To purchase a FailSafe key, refer to the [Hood lock \(Smart cover lock\) \(optional\) on page 45](#) section of this document for detailed information.

4. Slide the solenoid hood lock assembly (3) away from the chassis and out of the workstation.

Figure 4-7 Removing the hood lock

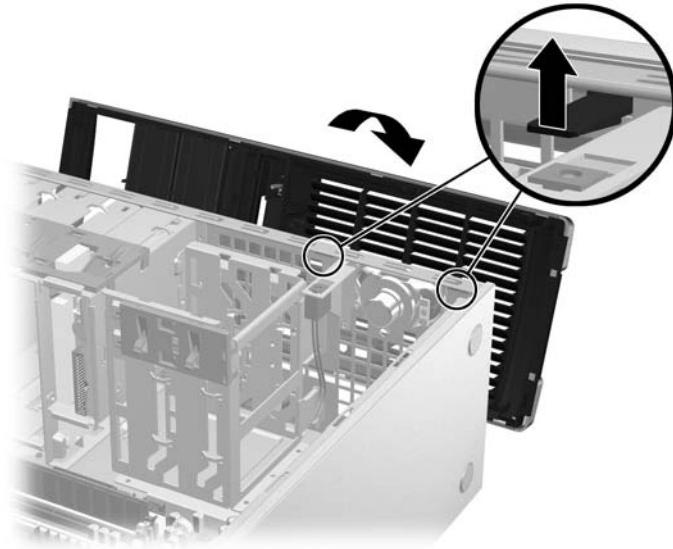


To install the hood lock, reverse the previous steps.

Front Bezel

1. Lift up on the two release snaps (1) located on the front bezel.
2. Rotate the front bezel away (2) from the chassis to remove the bezel.

Figure 4-8 Opening the front bezel



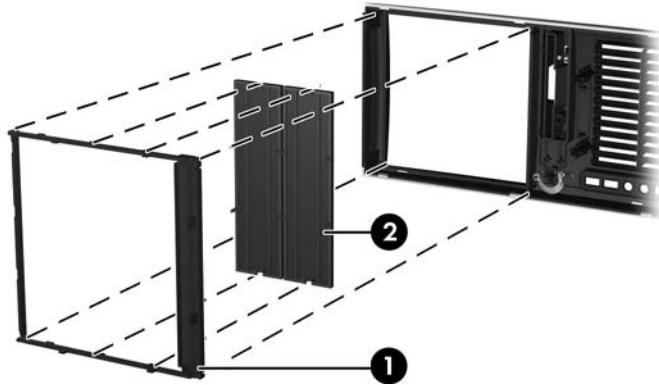
To replace the front bezel, align front bezel on the bottom and rotate in until it snaps into place.

Bezel blanks

To remove the bezel blanks:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the front bezel ([Front Bezel on page 62](#)).
2. Gently push the subpanel (1) out the back of the front bezel.
3. Remove the desired bezel blank by applying outward pressure on the subpanel (1) and pulling the blank (2) away.

Figure 4-9 Removing the bezel blanks



 **NOTE:** The bezel blanks are keyed to assist you in replacing the blanks. Also, the subpanel can be rotated 90 degrees to install the optical drives in desktop orientation if desired.

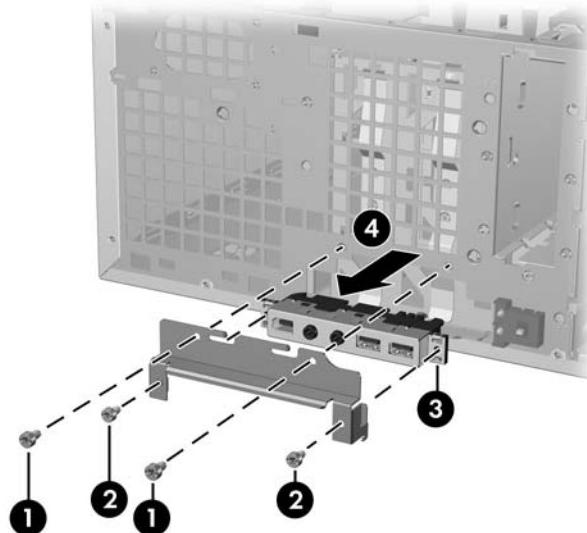
Front panel I/O device assembly

To remove the front panel I/O device assembly:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)), and remove the front bezel ([Front Bezel on page 62](#)).
2. Unlatch the plastic snap that secures the cables inside the chassis and disconnect the front panel I/O device assembly cables from the system board.
3. Remove the two smaller Torx screws (1) that hold the front panel I/O device assembly (3) and bracket to the chassis.
4. Remove the two larger Torx screws (2) that hold the front panel I/O device assembly (3) to the bracket.
5. Separate the bracket away from the front panel I/O device assembly.
6. Pull the front panel I/O device assembly out about two inches away (4) from the chassis.

7. Pull the front panel cables through the chassis and out the front of the workstation. You might have to slide the cables out one at a time.

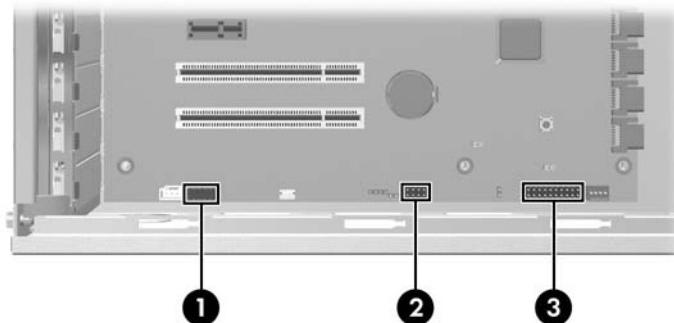
Figure 4-10 Removing the front panel I/O device assembly



To replace the front panel I/O device assembly:

1. Thread each front panel I/O device assembly cable through the same holes from which they were removed.
2. Push the front panel I/O device assembly into the chassis. Using your fingers, orient the cables so that there is enough room for the front panel I/O device assembly to easily fit in its slot.
3. Loosely put the bracket on the front panel I/O device assembly and hook the bracket to the chassis.
4. Screw the bracket to the front panel I/O device assembly and screw the bracket to the chassis.
5. Connect the front audio cable to (1). Connect the front USB cable to (2). Connect the front control panel cable to (3). If an IEEE-1394 card is installed, connect the front IEEE-1394 cable to the card.

Figure 4-11 Attaching front panel I/O device assembly cables

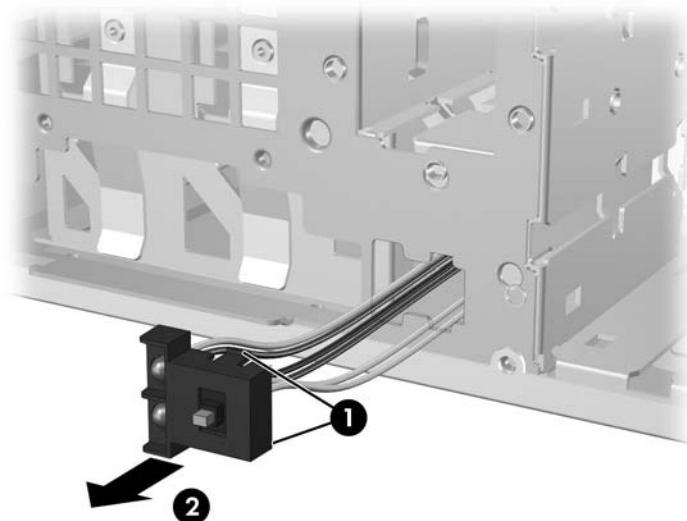


Power button

To remove the power button:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)), remove the front bezel ([Front Bezel on page 62](#)), and remove the front panel I/O device assembly ([Front panel I/O device assembly on page 63](#)).
2. Disconnect the power button assembly cable from the system board.
3. Press in on the clips (1) that secure the power button to the chassis.
4. Dislodge the metal clip from the chassis by rocking the power button back and forth. Then slide the power button assembly (2) out from the front of the chassis.

Figure 4-12 Removing the power button



To replace the power button, reverse the previous steps.

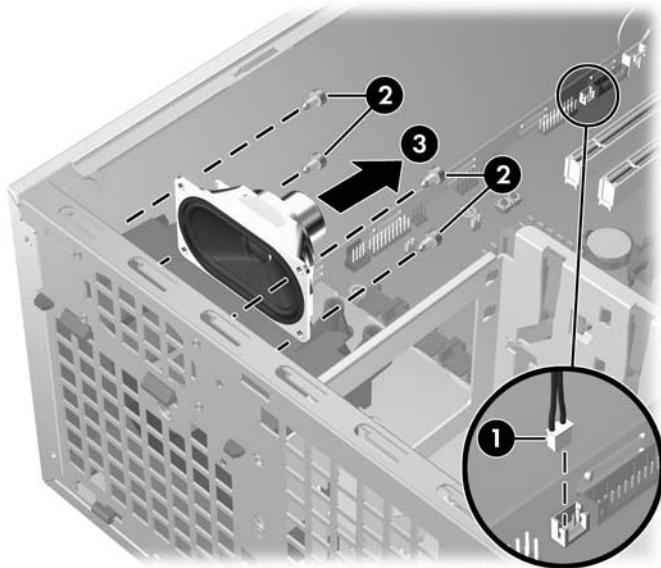
System speaker

To remove the speaker:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).
2. Disconnect the speaker cable (1) from the system board.

3. Remove the four screws (2) securing the speaker to the chassis and lift the speaker out (3) of the chassis.

Figure 4-13 Removing the speaker



To replace the speaker, reverse the previous steps.

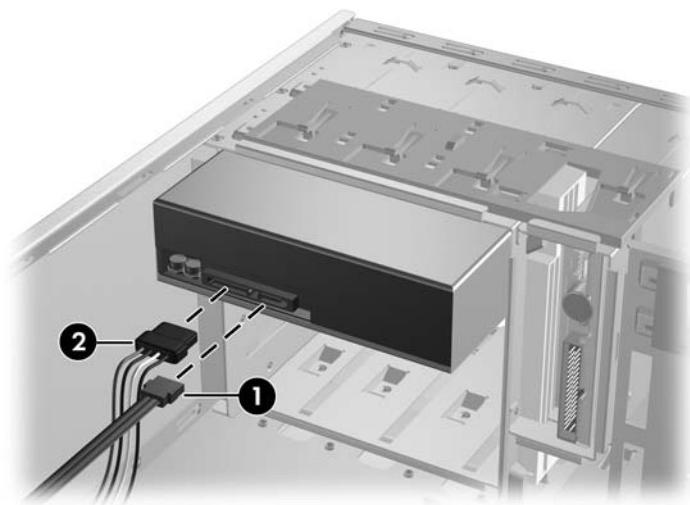
Optical drive (minitower configuration)

Your workstation might have a SATA optical drive. To remove an optical drive:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)) and remove the front bezel ([Front Bezel on page 62](#)).
- △ **CAUTION:** To prevent damage to the workstation, observe the following Electrostatic Discharge (ESD) precautions while performing the system parts removal and replacement procedures:
- Work on a static-free mat.
 - Wear a static strap to ensure that any accumulated electrostatic charge is discharged from your body to the ground.
 - Create a common ground for the equipment you are working on by connecting the static-free mat, static strap, and peripheral units to that piece of equipment.

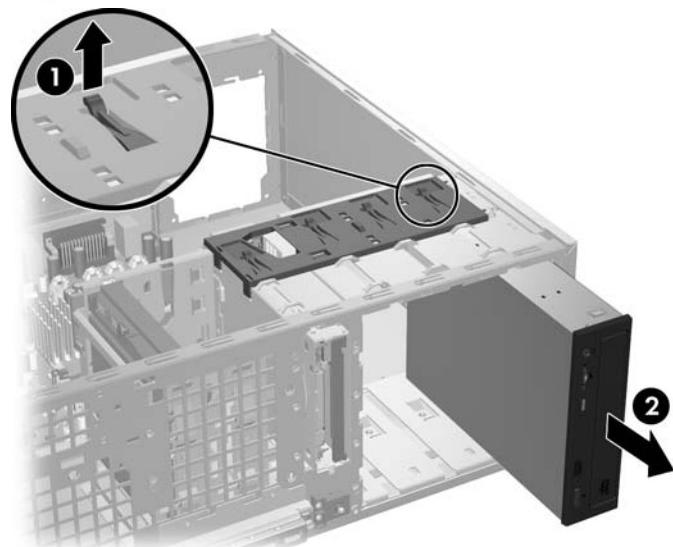
2. Disconnect the power (1) and data (2) cables from the drive, as shown in the following figure.

Figure 4-14 Disconnecting the cables from the optical drive (minitower configuration)



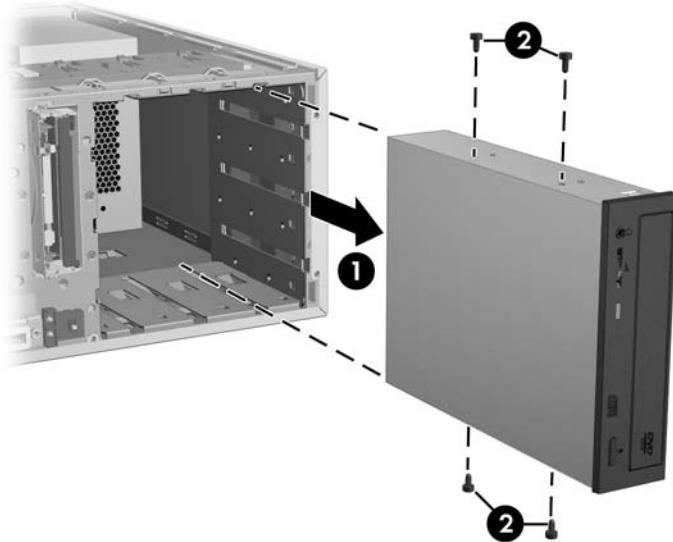
3. Lift the green drive-lock release lever (1) and gently slide the drive (2) out of the chassis.

Figure 4-15 Removing the optical drive from the chassis



4. If replacing this drive with another drive, remove the four guide screws (2), shown in the following figure, and set them aside to be used in the replacement drive.

Figure 4-16 Removing the guide screws

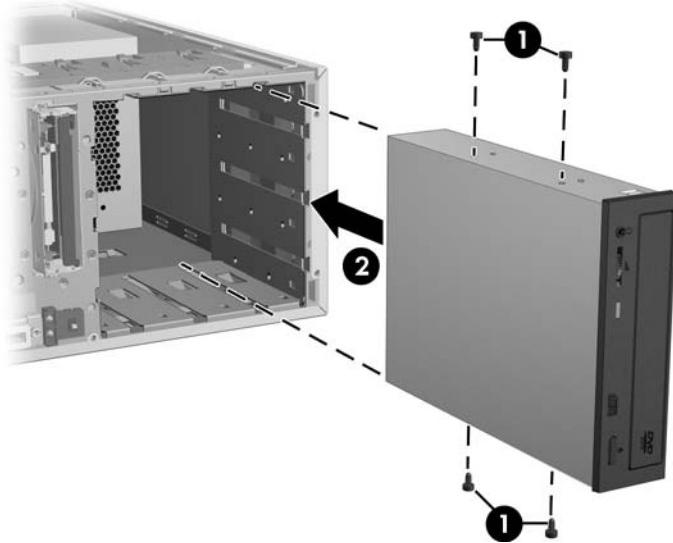


To install an optical drive:

NOTE: Always connect optical drives to the lowest numbered available SATA port, or immediately following any installed SATA hard drives. It is also important to connect all installed drives (both hard drives and optical drives) beginning at SATA0 and progressing through SATA3, leaving no gap in port numbering.

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)) and remove the front bezel ([Front Bezel on page 62](#)).
2. If not already installed, Insert the four guide screws (1), as shown in the following figure, into the exterior of the drive housing.

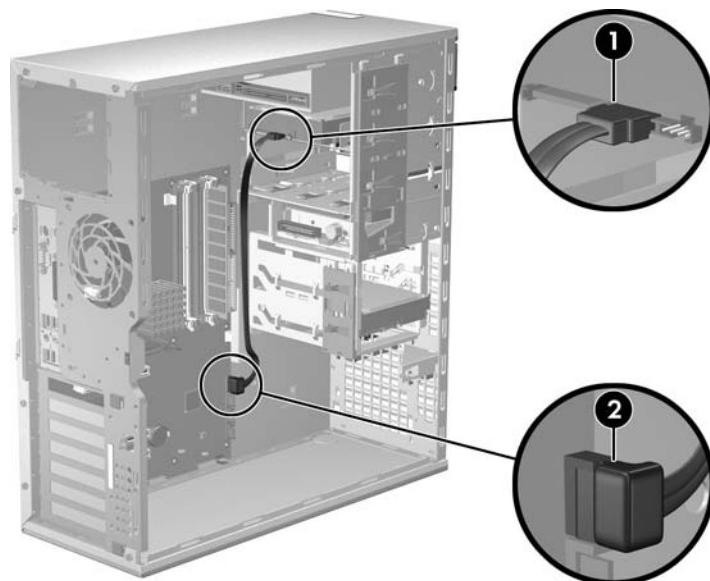
Figure 4-17 Installing the optical drive



3. Align the screws with the grooves in the drive bay and gently slide the drive into the workstation until it snaps into place (2).

CAUTION: Ensure that the optical drive is securely seated by pulling on it to see if the drive can become easily disengaged. Failure to securely seat the drive might cause damage to the drive when moving the workstation.
 4. Connect the power cable (2) first, then the data cable (in that order) to the drive and system board. This will allow any possible accumulated static electricity to discharge through the ground circuit of the power connector before the drive data circuits are connected.
- NOTE:** SATA ports on the system board must always be populated beginning with SATA0, and leaving no gaps as additional ports are connected. Connect the optical drive data cable to the lowest numbered SATA port still available.

Figure 4-18 Connecting the optical drive data cable



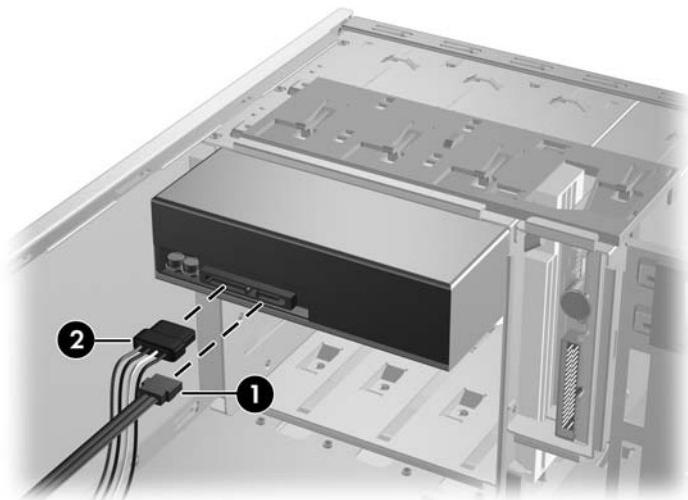
Optical drive (desktop configuration)

To remove an optical drive:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)) and remove the front bezel ([Front Bezel on page 62](#)).
- CAUTION:** To prevent damage to the workstation, observe the following Electrostatic Discharge (ESD) precautions while performing the system parts removal and replacement procedures:
- Work on a static-free mat.
 - Wear a static strap to ensure that any accumulated electrostatic charge is discharged from your body to the ground.
 - Create a common ground for the equipment you are working on by connecting the static-free mat, static strap, and peripheral units to that piece of equipment.

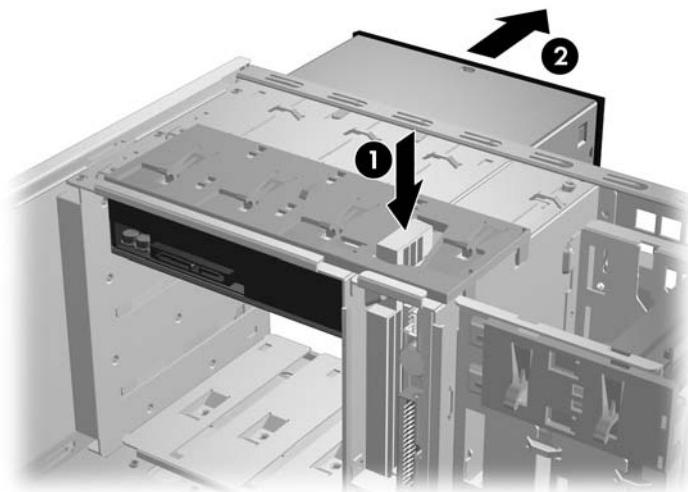
2. Disconnect the data (1) and power (2) cables from the drive.

Figure 4-19 Disconnecting the cables from the optical drive



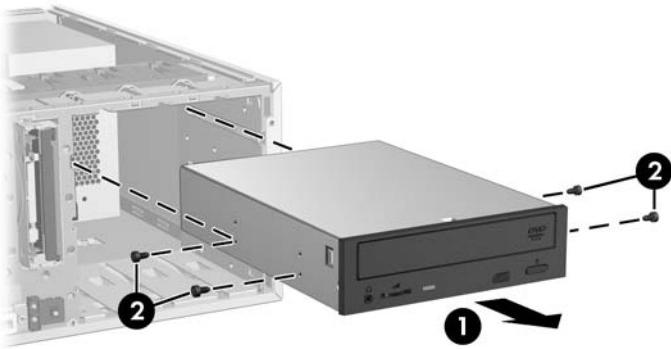
3. Press down on the yellow drive-lock release lever (1) and gently slide the drive 2 out of the chassis.

Figure 4-20 Removing the optical drive from the chassis



4. If the drive is to be replaced, remove the four installation guide screws (2), as shown in the following figure, and set them aside.

Figure 4-21 Removing the optical drive screws



To install an optical drive:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)) and remove the front bezel ([Front Bezel on page 62](#)).
2. If reinstalling an original optical drive, go to the next step. If installing a new drive or replacing the original drive with replacement drive, insert four installation guide screws into the drive housing (1), as shown in the following figure.

Figure 4-22 Installing the optical drive



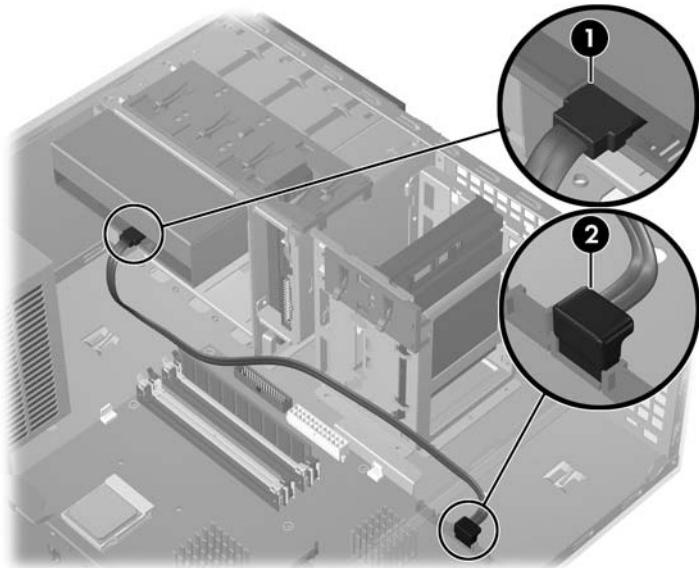
3. Align the guide screws with the grooves in the desired drive bay and gently slide the drive into the workstation until it snaps into place (2), as shown in the preceding figure.

△ **CAUTION:** Ensure that the optical drive is secure by pulling to see if the drive can become easily disengaged. Failure to do so can cause damage to the drive when moving the workstation.

4. Connect the power cable to the drive first. This will allow any possible accumulated static electricity to discharge through the ground circuit of the power connector before the drive data circuits are connected. Next, connect the data cable from the drive (1) and system board (2), as shown in the following figure.

 **NOTE:** Always connect optical drives to the lowest numbered available SATA port, or immediately following any installed SATA hard drives. It is also important to connect all installed drives (both hard drives and optical drives) beginning at SATA0 and progressing sequentially upward, and leaving no gap between ports SATA0 and SATA3 on the system board.

Figure 4-23 Connecting the optical drive data cable to the system board



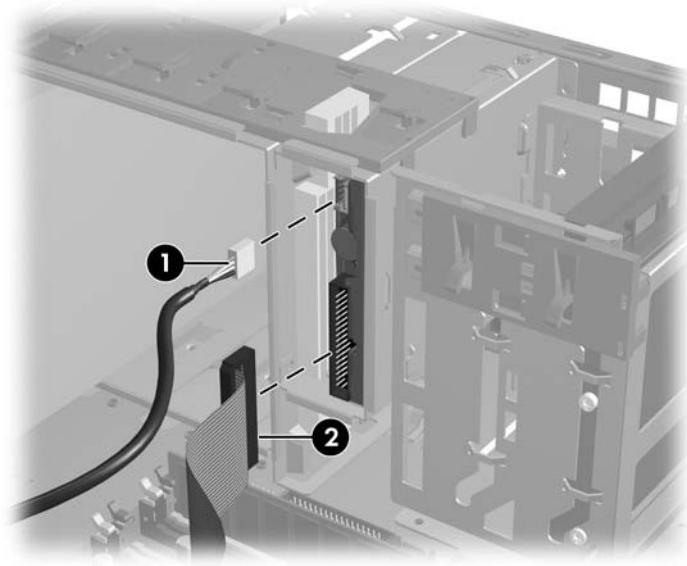
Diskette drive (optional)

To remove a diskette drive:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)), and the front bezel ([Front Bezel on page 62](#)).
-  **CAUTION:** To prevent damage to the workstation, observe the following Electrostatic Discharge (ESD) precautions while performing the system parts removal and replacement procedures:
 - Work on a static-free mat.
 - Wear a static strap to ensure that any accumulated electrostatic charge is discharged from your body to the ground.
 - Create a common ground for the equipment you are working on by connecting the static-free mat, static strap, and peripheral units to that piece of equipment.

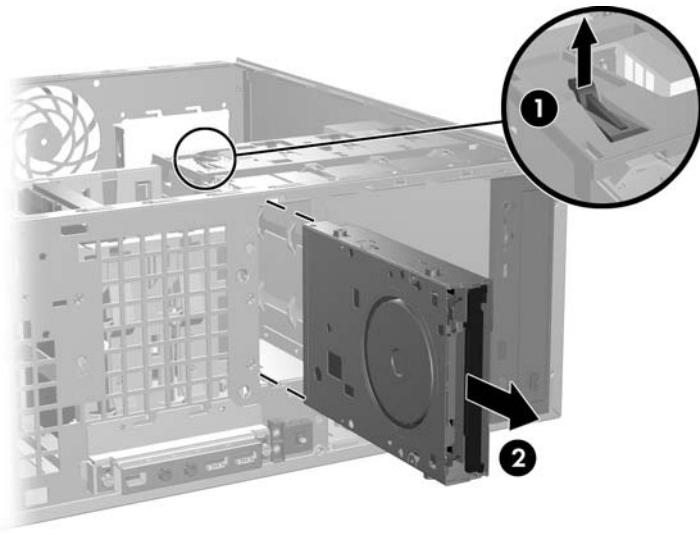
2. Disconnect the data (1) and power (2) cables from the back of the diskette drive.

Figure 4-24 Disconnecting the cables from the diskette drive



3. Lift the green drive-lock release tab (1) and gently slide the drive 2 out at the same time.

Figure 4-25 Removing the diskette drive from the chassis



To replace a diskette drive:

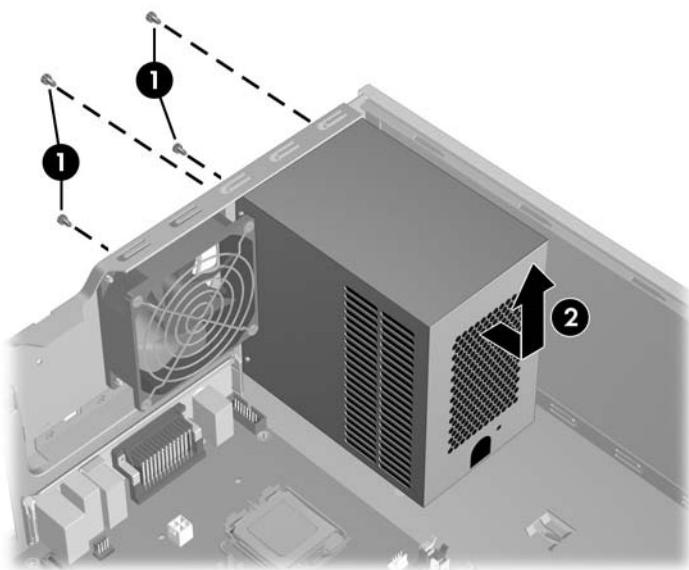
1. Align the metal protrusions on the side of the drive with the grooves in the diskette drive bay and slide the diskette drive into the bay until it stops.
2. Connect the power cable first, then the data cable (in that order) to the drive and the system board. This sequence will allow any possible accumulated static electricity to discharge through the ground circuit of the power connector before the drive data circuits are connected.
3. Connect the cables to the back of the diskette drive.

Power supply

To remove the power supply:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).
TIP: This next step requires disconnecting several power cables. To speed up reinstalling the power supply, it is helpful to write down the numbers on the cables so that you can easily reconnect the cable to the correct devices.
2. Disconnect all cables from the system board, drives, or cards.
3. Remove the four screws (1) from the back panel.
4. Slide the power supply toward the front and lift it (2) out of the chassis.

Figure 4-26 Removing the power supply



To replace the power supply, reverse the previous steps.

Workstation power connections to drives and the system board

For help in identifying power cables, refer to the following information. Route or tie cables so they cannot interfere with the processor heatsink fan.

Figure 4-27 Power connections for a typical HP xw4550 Workstation configuration

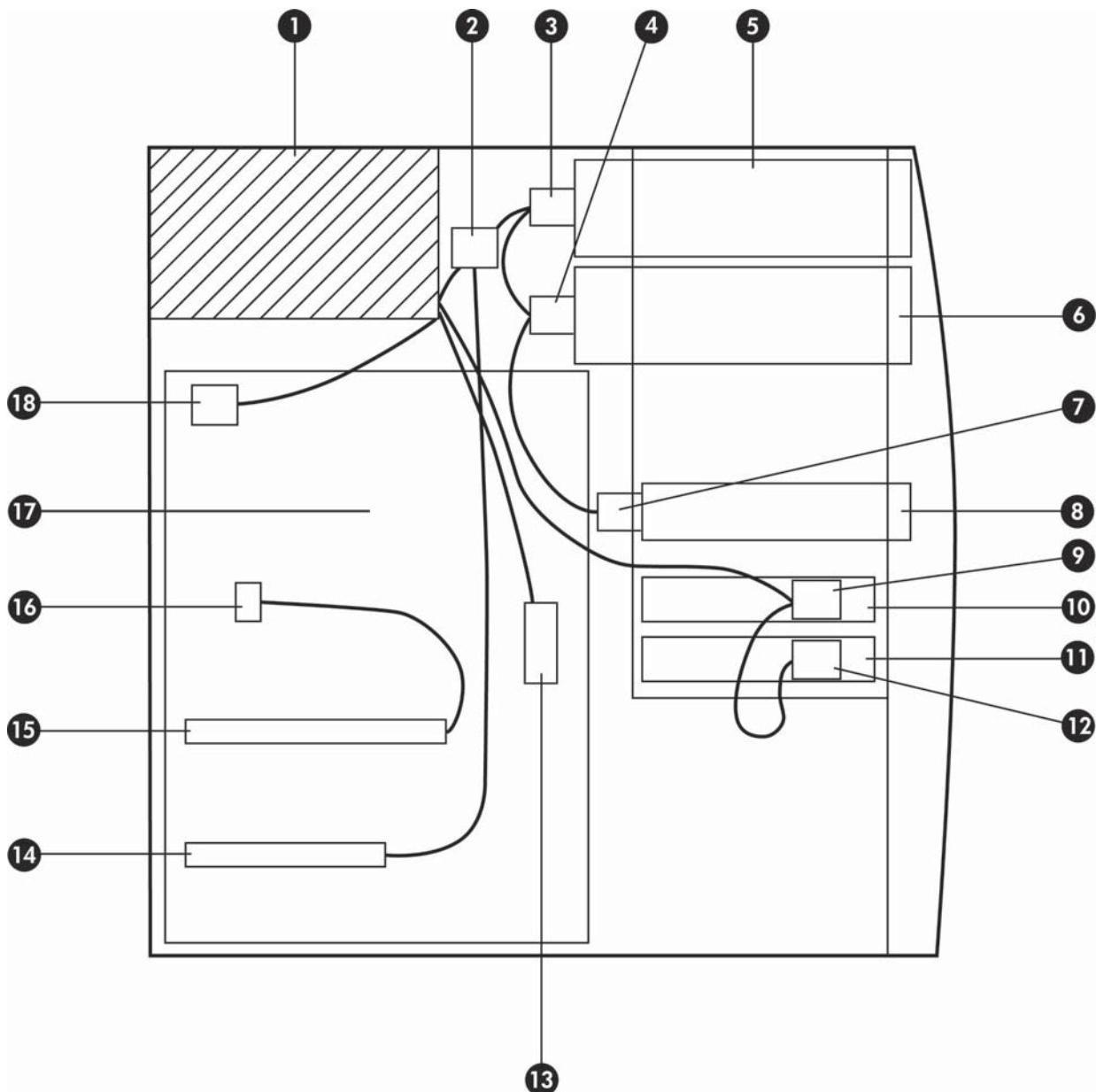


Table 4-4 HP xw4550 Workstation power connections

Item	Description	Item	Description
1	Workstation power supply	10	First hard drive
2	Power connector P6 (for optional PCI card power)	11	Second hard drive
3	Power connector P7 to first optical drive	12	Power connector P5 to second hard drive

Table 4-4 HP xw4550 Workstation power connections (continued)

Item	Description	Item	Description
4	Power connector P8 to second optical drive	13	Power connector P1 to system board
5	First optical drive	14	PCI slot (shows optional IEEE 1394 PCI card with optional adapter cable connected to power connector P6)
6	Second optical drive	15	Optional graphics card (with power connection to system board graphics power connector P4) NOTE: Disables workstation integrated graphics capability when installed.
7	Power connector P9 to diskette drive	16	6-pin system board connector P4 for graphics card auxiliary power cable.
8	Diskette drive	17	Workstation system board
9	Power connector P4 to first hard drive	18	4-pin power connector P3 to system board P3

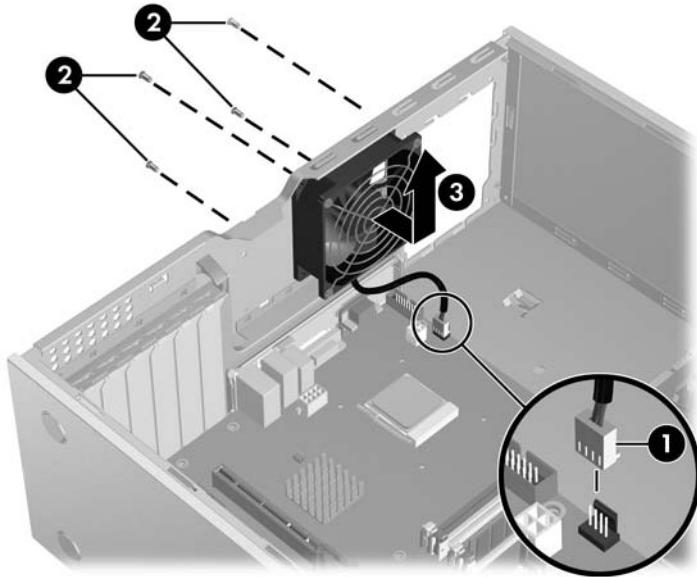
System fan assembly

To remove the system fan assembly:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).
2. Disconnect the fan plug (1) from the system board.

3. Remove the four screws (2) from the rear of the chassis with a Phillips screwdriver, and lift it (3) out of the chassis.

Figure 4-28 Removing the system fan



To replace the system fan assembly, reverse the previous steps.

- △ **CAUTION:** When replacing the system fan, be sure that the fan is situated so that the airflow direction arrow is pointing toward the rear of the chassis.

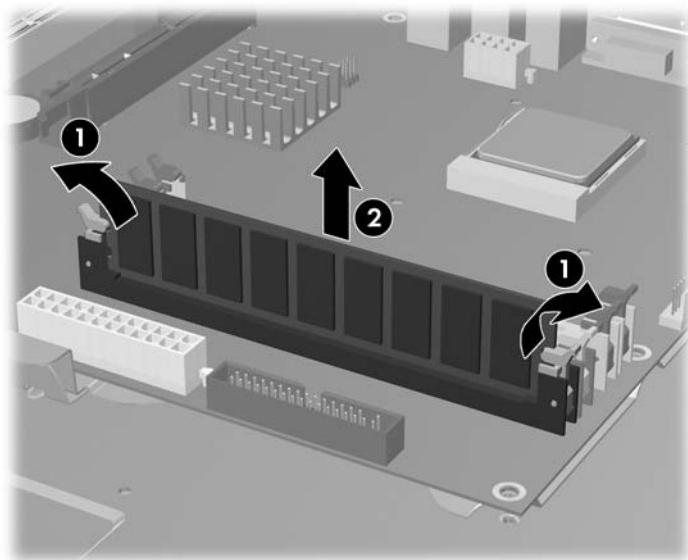
Memory

To remove a memory module:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).
- △ **CAUTION:** To ensure that memory modules are not damaged during removal or installation, power off the workstation and unplug the power cord from the AC power outlet. If you do not unplug the power cord while installing memory, your memory modules might be damaged and the system will not recognize the memory changes.
2. Gently push outward on the socket levers (1).

3. Lift the DIMM (2) straight up and remove it from the workstation. Store the DIMM in an anti-static bag.

Figure 4-29 Removing a memory module



Memory module features

Workstation memory module features include:

- Four memory sockets for DIMMs
- Support for configurations of 512 MB to 4 GB
- Support for dual-channel DIMMs

Memory module requirements

⚠ **CAUTION:** Hewlett-Packard ships DIMMs with this product that are electrically and thermally compatible with the product. Because third-party DIMMs might not be electrically or thermally compatible, third-party DIMMs are not supported by HP.

📝 **NOTE:** Use only industry-standard unbuffered, DDR2, PC2-5300E ECC (667 MHz) DIMMs.

If multiple DIMMs are installed in a workstation, they must be installed in pairs of the same size and type in both slot 1 and slot 2 of the same channel.

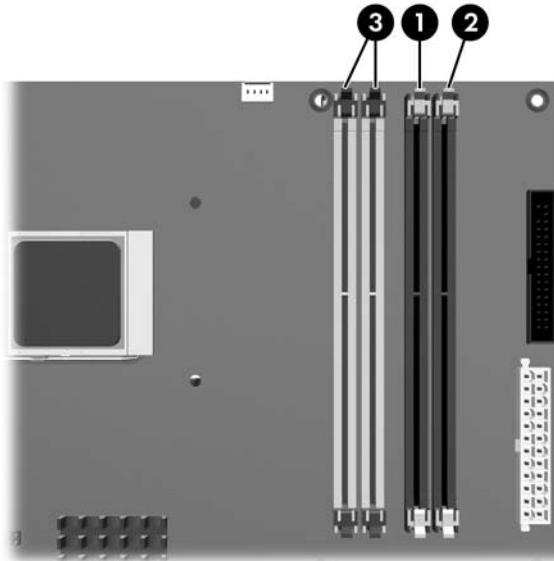
For supported DIMM configurations, see: <http://www.hp.com/go/productbulletin> to view the Quick Specs for the HP xw4550 Workstation.

Required loading order

Use the following illustration as a guide for installing memory modules:

- When installing a single DIMM only, install it in socket DIMM1A (item 1 in the illustration, and as shown on the system board label).
- Always install the first DIMM pair in sockets DIMM1A and DIMM1B (items 1 and 2, respectively, in the figure, and as shown on the system board label).
- Install the second DIMM pair in sockets DIMM2A and DIMM2B (item 3 in the figure, and as shown in the system board label).

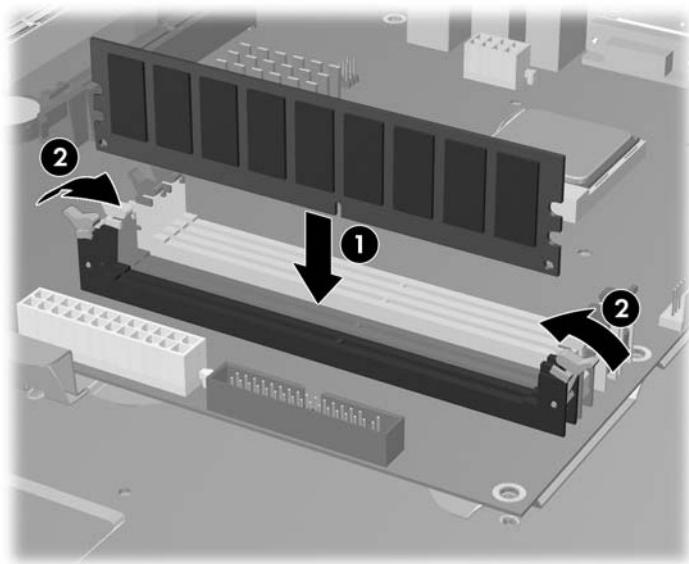
Figure 4-30 System board DIMM sockets



To install a memory module:

- Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).
- Gently push outward on the socket locking levers to allow DIMMs to be inserted.
- CAUTION:** DIMM contact connectors and system board DIMM slots are keyed to guide proper DIMM alignment. Always align the keyway on the DIMM contact connector to the key on the system board DIMM slot when installing DIMMs to prevent damage to the DIMMs.
- Lower the DIMM straight down (1) and secure the socket levers (2) into their locked position over the ends of the memory modules.

Figure 4-31 Installing a memory module



PCI Slots

This section contains information on PCI slots.

Your workstation contains two PCI slots (items 3 and 4 in the illustration), one PCI Express x4(1) slot (item 2 in the illustration), and one PCI Express x16 (item 1 in the illustration). The PCI Express x16 is normally used for high-performance graphics cards.

 **NOTE:** The workstation integrated graphics capability is disabled when an optional graphics card is installed in the PCI Express x16 slot.

Figure 4-32 Identifying the PCI slots

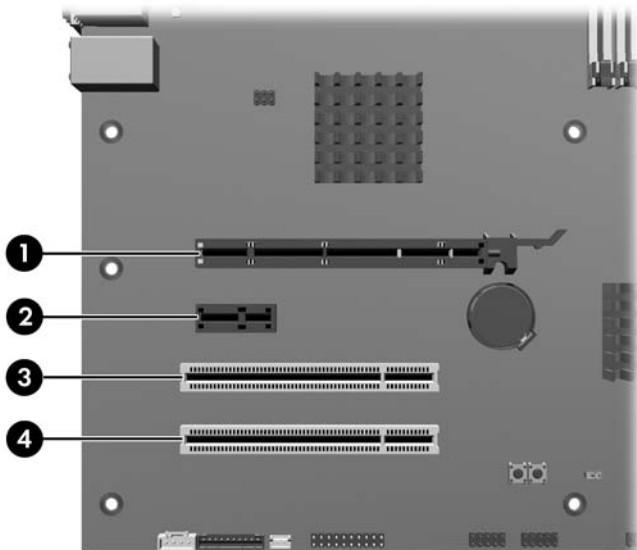


Table 4-5 PCI slots

Slot	Type	Slot power (Maximum)
1	PCI Express x16	75 W*
2	PCI Express x4(1)	25 W*
3	PCI 32/33	25 W*
4	PCI 32/33	25 W*

* In addition to these slot power specifications, the overall power consumption of the system (including I/O cards, processor, and memory) must not exceed the maximum ratings of the system power supply.

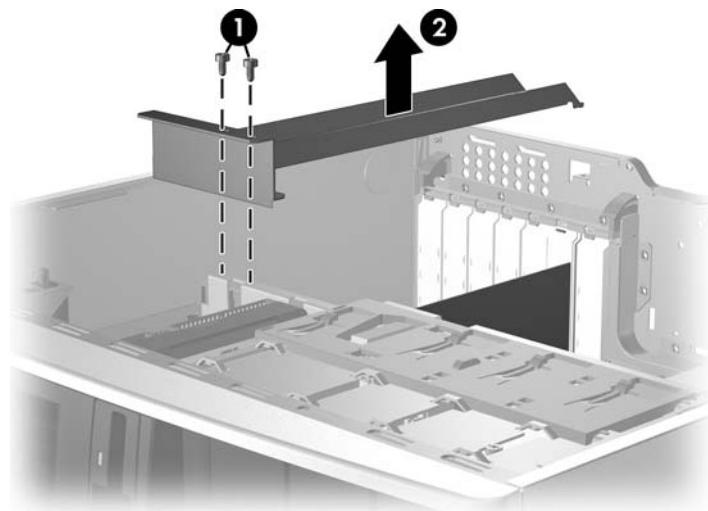
PCI retainer

For added protection, some cards have PCI retainers installed to prevent movement during shipping.

To remove the PCI retainer:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).
2. Remove the two screws (1) retaining the retainer and lift it (2) out of the chassis.

Figure 4-33 Removing the PCI retainer

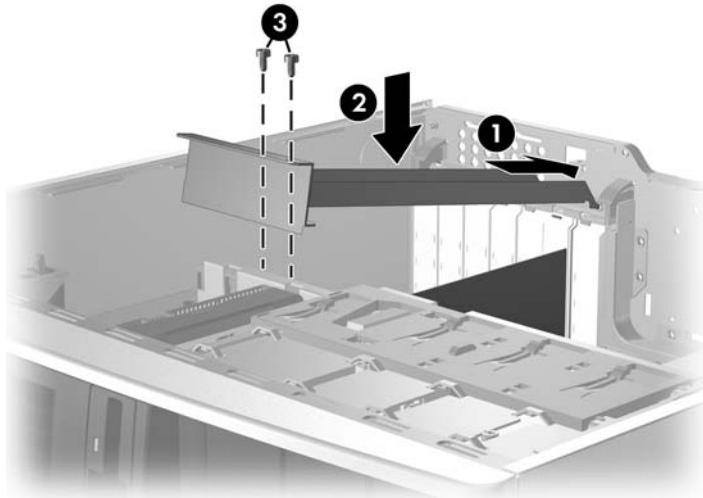


To install the PCI retainer:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).
2. Engage the rear bracket (1) with the holes in the rear of the chassis before rotating it down (2) into position..

- Secure the bracket with two screws (3).

Figure 4-34 Installing the PCI retainer



PCI Express

PCI Express improves system attributes. PCI Express enables a low-power, scalable, high-bandwidth communication path with a small number of connections (wires) compared to traditional parallel interfaces (for example, PCI). The PCI Express I/O slots can support other PCI Express cards with lesser bus bandwidth than what is physically defined for the slot. Use the following table to determine compatibility.

Table 4-6 PCI Express compatibility matrix for the HP xw4550 Workstation

	Mechanical compatibility	Electrical compatibility
PCI Express x16 slot	x1, x4, x8 and x16 cards	x1 , x4, x8, and x16 modes
PCI Express x4(1)slot	x1 and x4 cards	x1 mode

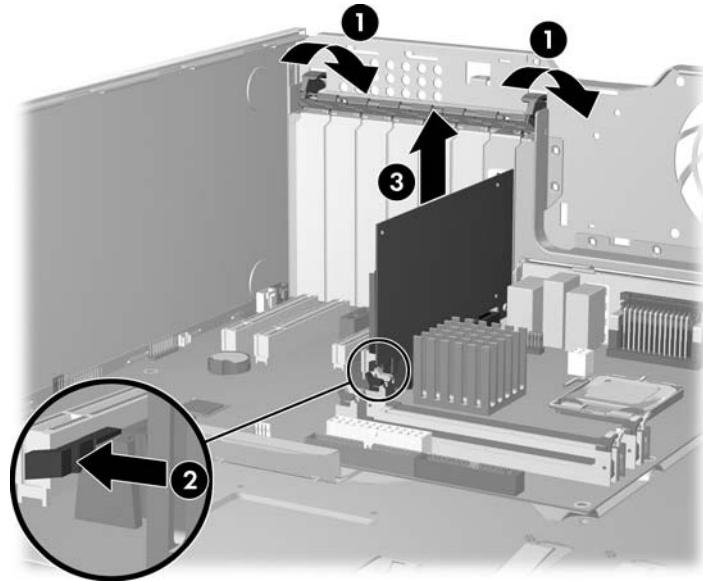
To remove a PCI Express card:

- Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)), and remove the PCI retainer ([PCI retainer on page 81](#)), if installed.
- Lift the PCI levers (1) by first pressing down and then up.
- If removing a PCI Express x16 graphics card, press in on the release lever (2) while lifting the card (3) out of the chassis. Store the card in an anti-static bag.

If removing another type of PCI Express card, lift the card out of the chassis. You do not need to press in on the release lever.

4. Install a PCI slot cover and close the PCI levers. If the PCI levers do not close, be sure all cards are properly seated and then try again.

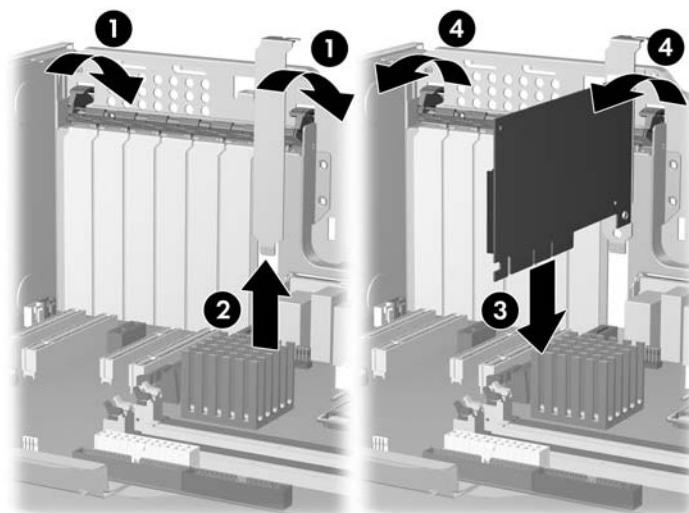
Figure 4-35 Removing the PCI Express card



To install a PCI Express card:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)), and remove the PCI retainer ([PCI retainer on page 81](#)), if installed.
2. Lift the PCI levers (1) by first pressing down and then up.
3. Remove the PCI slot cover (2).
4. Lower the PCI Express card (3) into the chassis. Verify that the keyed components of the card align with the socket.
5. Close the PCI retention clamp (4) by rotating the clamp downward and pushing down on the two green snaps from the rear panel of the chassis.

Figure 4-36 Installing the PCI Express card

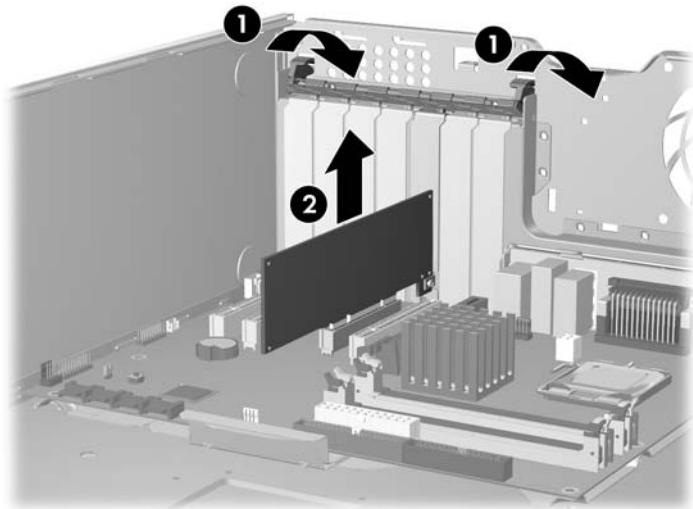


PCI

To remove a PCI card:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)), and remove the PCI retainer ([PCI retainer on page 81](#)), if installed.
2. Lift the PCI levers (1) by first pressing down and then up.
3. Lift the PCI card (2) out of the chassis. Store the card in an anti-static bag.
4. Install a PCI slot cover and close the PCI levers. If the PCI levers do not close, be sure all cards are properly seated and then try again.

Figure 4-37 Removing the PCI card

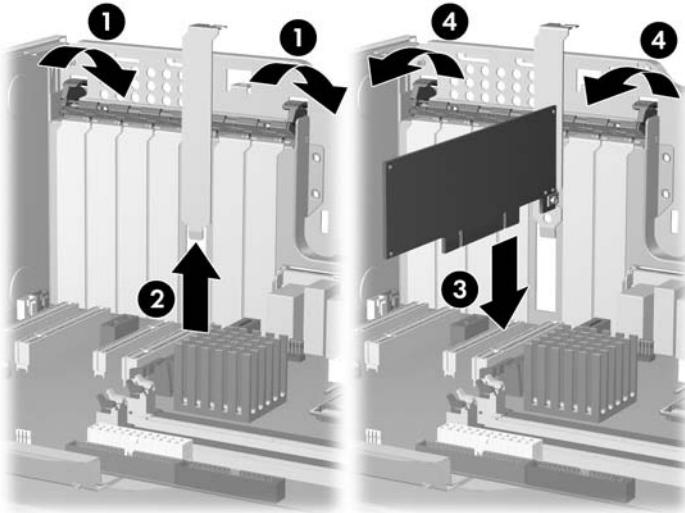


To install a PCI card:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)), and remove the PCI retainer ([PCI retainer on page 81](#)), if installed.
2. Lift the PCI levers (1) by first pressing down and then up.
3. Remove the PCI slot cover (2).
4. Lower the PCI (3) card into the chassis. Verify that the keyed components of the card align with the socket.

5. Close the PCI retention clamp (4) by rotating the clamp downward and pushing down on the two green snaps from the rear panel of the chassis.

Figure 4-38 Installing the PCI card

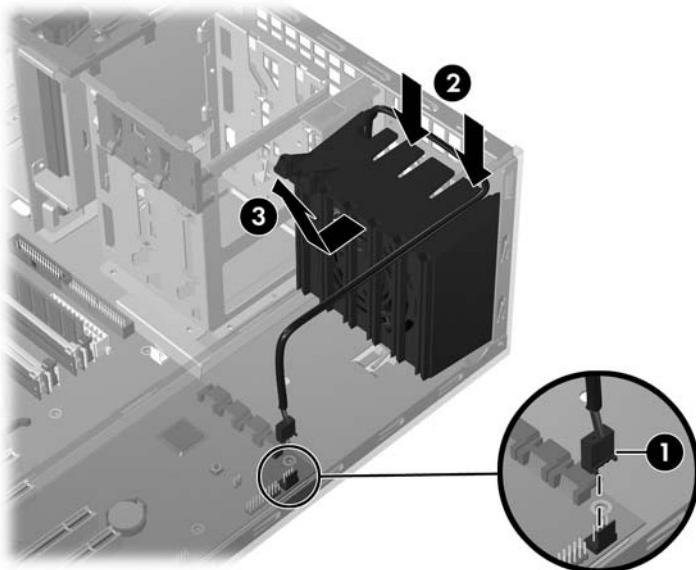


Front PCI card guide and optional fan removal

NOTE: The fan is used only for special configurations, but the card guide is used with all full-length add-in cards.

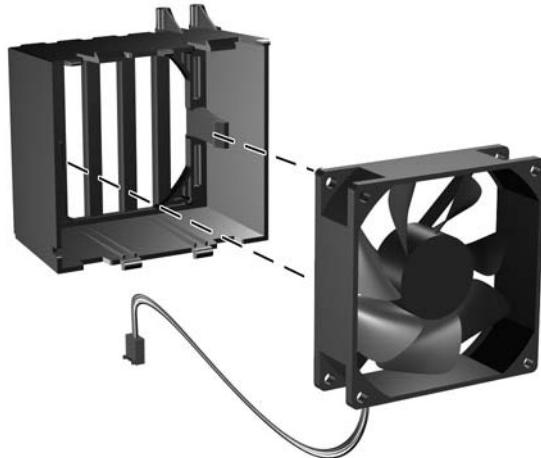
1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)), and remove the front bezel ([Front Bezel on page 62](#)).
2. Disconnect the fan wire (1) from the PCI FAN connector on the system board and thread it out of the card guide.
3. Unsnap the fan housing from the chassis (2) and lift it out of the chassis (3).

Figure 4-39 Removing the front (PCI) fan



4. Remove the fan from the fan housing by applying outward pressure on the fan housing while pushing the fan out of the housing.

Figure 4-40 Removing the fan from the card guide



To replace the front fan, reverse the previous steps, but be sure that the airflow direction arrow on the side of the fan points to the rear of the chassis.

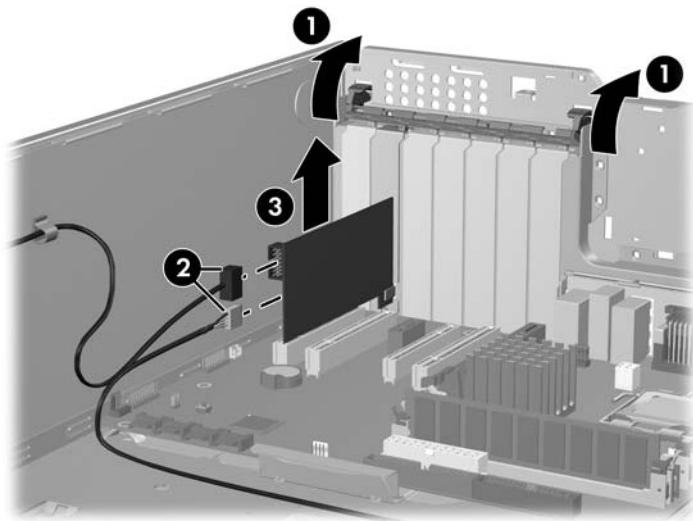
IEEE-1394 Card (optional)

To remove an IEEE-1394 card:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)), and remove the front bezel ([Front Bezel on page 62](#)).
2. Lift the PCI levers (1) by first pressing down and then up.
3. Disconnect the front I/O cable and power cable (2) from the card.
4. Lift the IEEE-1394 card (3) out of the chassis. Store the card in an anti-static bag.

5. Install a PCI slot cover and close the PCI levers. If the PCI levers do not close, be sure all cards are properly seated and then try again.

Figure 4-41 Removing the IEEE-1394 card



To install an IEEE-1394 card, reverse the previous steps.

Battery

The battery that comes with the workstation provides power to the real-time clock and has a minimum lifetime of approximately three years.

⚠ WARNING! This workstation contains a lithium battery. There is a risk of fire and chemical burn if the battery is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose in water or fire, or expose it to temperatures higher than 140°F (60°C).

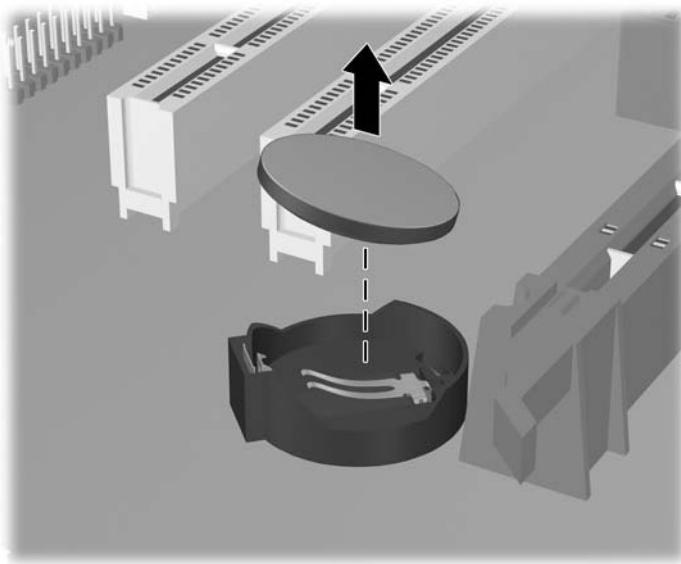
△ CAUTION: Before removing the battery, be sure your CMOS settings are backed up as all CMOS settings are lost when the battery is removed. To back up the CMOS settings, use the Computer Setup (F10) Utility and run the Save to Diskette option from the File menu.

📝 NOTE: Batteries, battery packs, and accumulators should not be disposed of together with general household waste.

To remove the battery:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).
2. On the system board, press on the release tab of the battery holder.
3. Rotate the battery enough to get beyond the latch and lift it straight up.

Figure 4-42 Removing the battery



To install the battery, confirm the polarity (positive-negative), position battery edge under plastic housing tabs, and press down until the metal snaps engage.

SATA hard drive

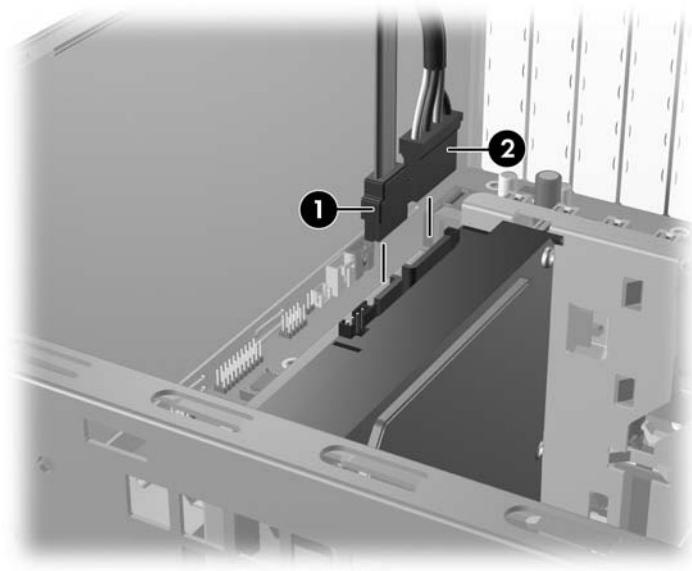
To remove a hard drive:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).

△ **CAUTION:** To prevent damage to the workstation, observe the following Electrostatic Discharge (ESD) precautions while performing the system parts removal and replacement procedures:
 - Work on a static-free mat.
 - Wear a static strap to ensure that any accumulated electrostatic charge is discharged from your body to the ground.
 - Create a common ground for the equipment you are working on by connecting the static-free mat, static strap, and peripheral units to that piece of equipment.

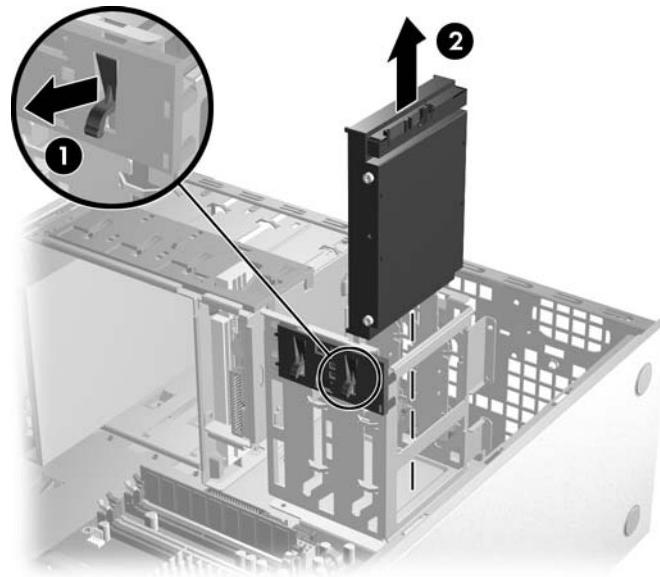
2. Disconnect the data (1) and power (2) cables from the hard drive.

Figure 4-43 Removing the hard drive cables



3. Lift up on the green drive-lock release tab (1) and slide the hard drive (2) out of the chassis.

Figure 4-44 Removing the hard drive from the chassis



4. If you will be replacing the hard drive with a replacement drive, remove the four installation guide screws from the drive housing (as shown in the following figure) and retain them for reuse.

Figure 4-45 Removing hard drive installation guide screws



To install a SATA hard drive:

 **NOTE:** Always connect SATA hard drives to the two lowest numbered ports on the system board (SATA0 and SATA1), and always beginning with SATA0.

A third and fourth SATA hard drive are not supported by the HP xw4550 Workstation.

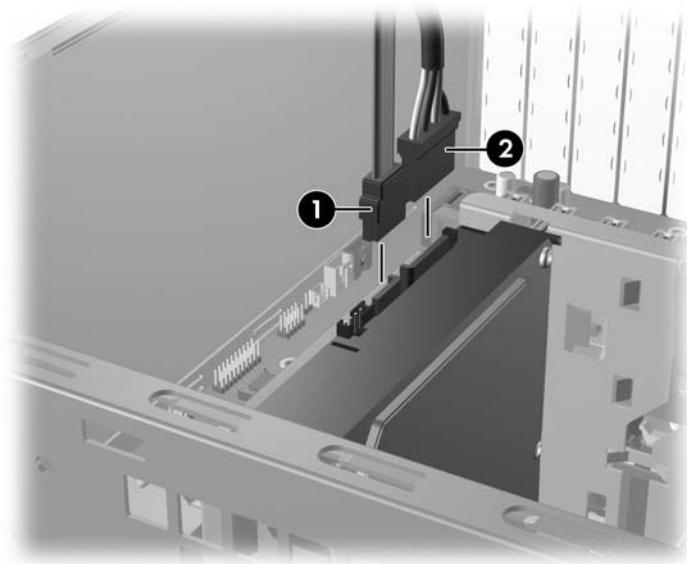
1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)).
2. Select a drive bay in which to install the drive.
3. If installing a new or replacement drive, install four guide screws in the hard drive housing (as shown in the following figure), and carefully slide the drive into the selected bay until it snaps into place. If reinstalling an existing hard drive, ensure the original installation guide screws are inserted in the drive housing, align the screws with the screw slots in the chosen drive bay, and carefully slide the drive into the bay until it snaps into place.

Figure 4-46 Installing hard drive installation guide screws



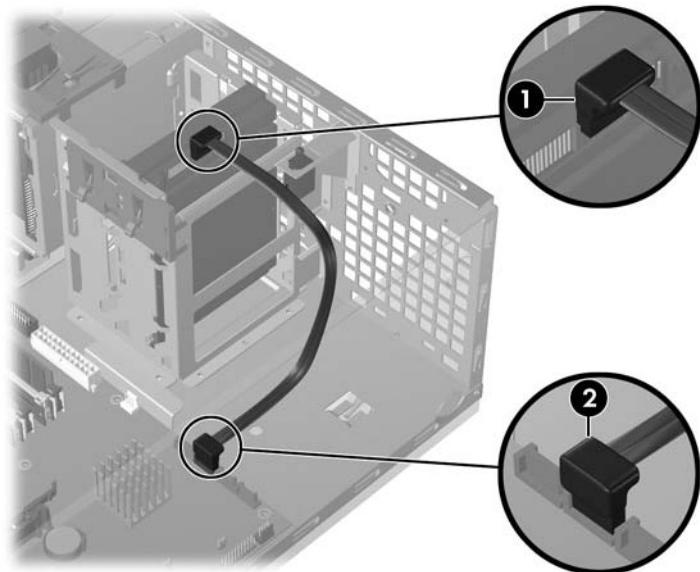
4. Connect the power cable (2) to the drive (as shown in the following figure). This will allow any possible accumulated static electricity to discharge through the ground circuit of the power connector before the drive data circuits are connected.

Figure 4-47 Installing the SATA hard drive



5. Connect the data cable (1) between the hard drive (shown in the previous figure) and the appropriate serial ATA port (2 in the following figure) using the following port connection sequence:
 - Connect the first hard drive (SATA 0) to port SATA0 on the system board.
 - Connect the second hard drive (SATA 1) to port SATA1 on the system board.

Figure 4-48 Connecting the SATA data cable



Processor heatsink

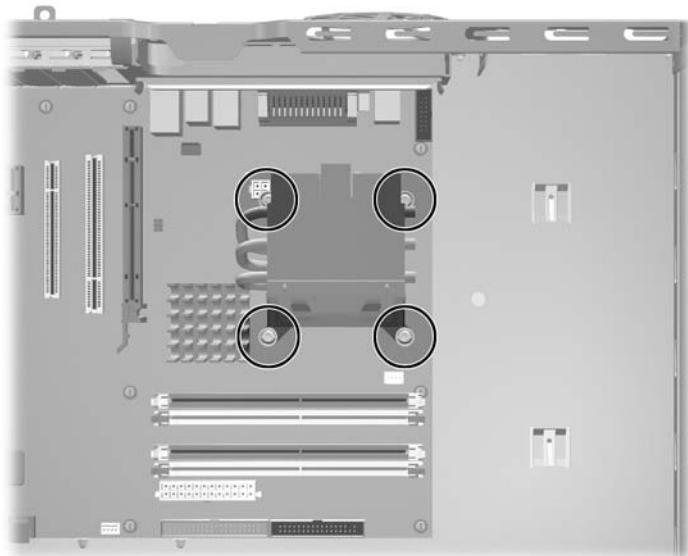
 **NOTE:** The following illustrated processor heatsink is typical of what you might have in your workstation. Be aware that different variations of the processor heatsinks exist, but the overall procedures listed are sufficient to assist you in removing the processor heatsink.

To remove the processor heatsink:

1. Apply power to the workstation for a minimum of five minutes before proceeding to the next step. Heat generated by this process will cause the thermal grease between the heatsink and processor surfaces to become less viscous, thereby allowing the heatsink to be separated from the processor with minimum force.
2. Shut down and disconnect power from the workstation, and remove the side access panel.
3. Loosen the four processor screws slowly and evenly, loosening them two at a time as a diagonally opposing pair.

 **NOTE:** Do not fully loosen one screw, and then move on to the next. Loosen all of the screws a little at a time, being sure the processor remains level to the system board.

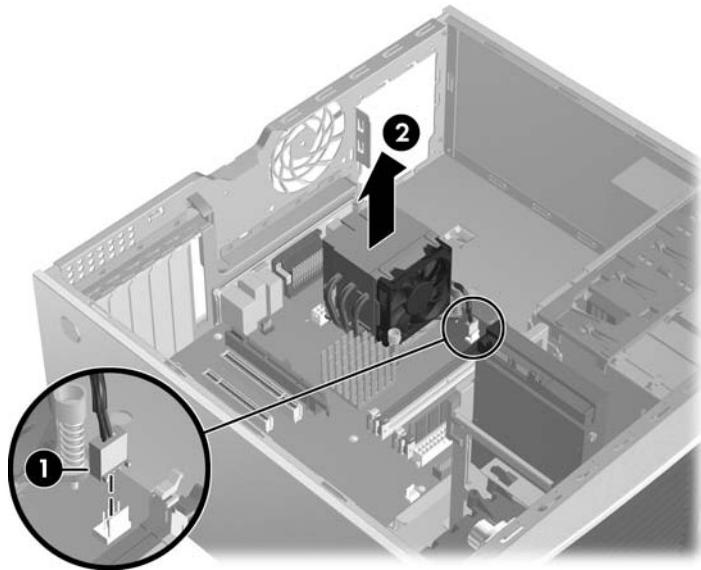
Figure 4-49 Identifying proper screw loosening sequence



4. Disconnect the heatsink fan cable (1) from the system board.
5. Gently twist the heatsink unit to break the thermal grease binding.

6. Lift the heatsink (2) from the processor.

Figure 4-50 Removing the processor heatsink from the system board



7. Use alcohol and a soft cloth to clean all of the thermal interface residue from the heatsink and processor.

△ **CAUTION:** Allow the alcohol on the processor and heatsink to dry completely.

To replace the processor heatsink:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)). Remove the side chassis access panel ([Side access panel on page 59](#)).
2. Check for proper processor seating in the socket by carefully trying to lift the processor out of the socket with your fingers. A properly seated processor does not lift out of the socket.
3. If reusing the original heatsink, apply thermal grease to the center of the processor top surface. If using a new processor heatsink, do not apply thermal grease to the processor; the a new heatsink will have grease already applied to the heatsink surface. In this case, discard the thermal grease protective liner from the bottom of the new heatsink before installing.

📝 **NOTE:** Do not touch the exposed thermal grease when handling the processor heatsink.

4. Lower the processor heatsink onto the system board over the processor.
5. Carefully tighten the four screws a little at a time; do not fully tighten one screw and move onto the next. Be sure the processor remains level and be sure you do not overtighten the screws. If you have a torque-limited driver available, tighten the screws to 6 in.-lbs.

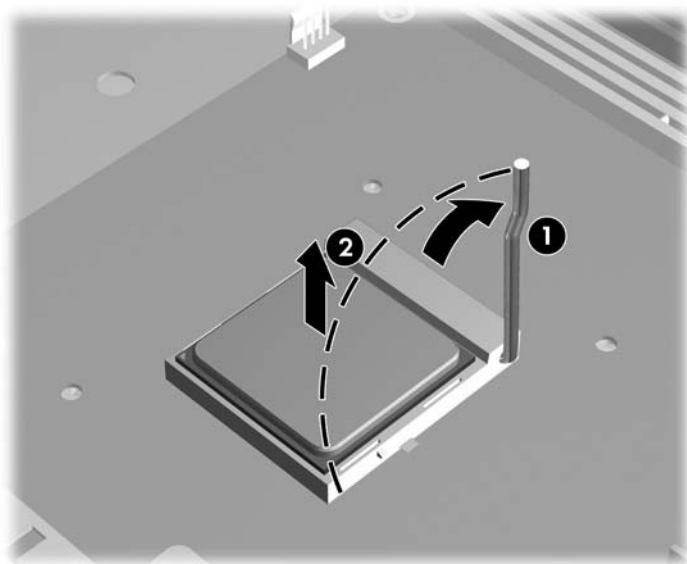
△ **CAUTION:** Do not overtighten the screws. If you overtighten the screws, you risk stripping the threads in the system board tray.

Processor

To remove the processor:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)) and the processor heatsink ([Processor heatsink on page 92](#)).
2. Raise the lever (1) on the processor socket handle to slide the processor into position for removal (as shown in the following illustration).
3. Pull the processor (2) straight up and out of the socket.

Figure 4-51 Raising the processor socket handle



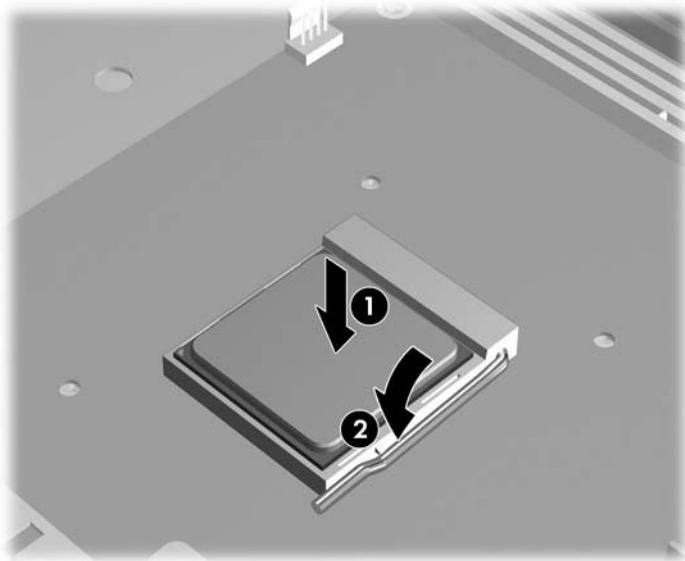
 **NOTE:** Immediately store the processor in a static-safe container where it will not be damaged.

To replace the processor:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)), remove the side access panel ([Side access panel on page 59](#)), the processor heatsink ([Processor heatsink on page 92](#)), and the processor ([Processor on page 94](#)).
 2. Raise the processor socket handle fully (the full swing angle of the lever is approximately 90 degrees).
-  **CAUTION:** Processor pins are delicate and bend easily. Use extreme care when aligning and inserting the processor pins into the socket to avoid bending the pins.

3. To properly align the processor with the socket, orient the small triangle image located on one corner of the processor circuit board to the matching triangle image on one corner of the processor socket (see illustration below). With all processor pins properly aligned, press the processor straight down into the socket until the processor is seated.

Figure 4-52 Seating and locking the processor



4. Ensure that the underside of the processor is sitting level with the top of the processor socket, then press lightly on the top of the processor while simultaneously closing the socket lever to the locked position (as shown in the above illustration).
5. Check for proper processor seating in the socket by carefully trying to lift the processor out of the socket with your fingers. A properly seated processor does not lift out of the socket.

System board

To remove the system board:

1. Disconnect power from the system ([Predisassembly procedures on page 55](#)) and remove the side access panel ([Side access panel on page 59](#)), remove all expansion boards, and graphics cards.
2. Disconnect all cabling from the system board and remove all I/O cards.

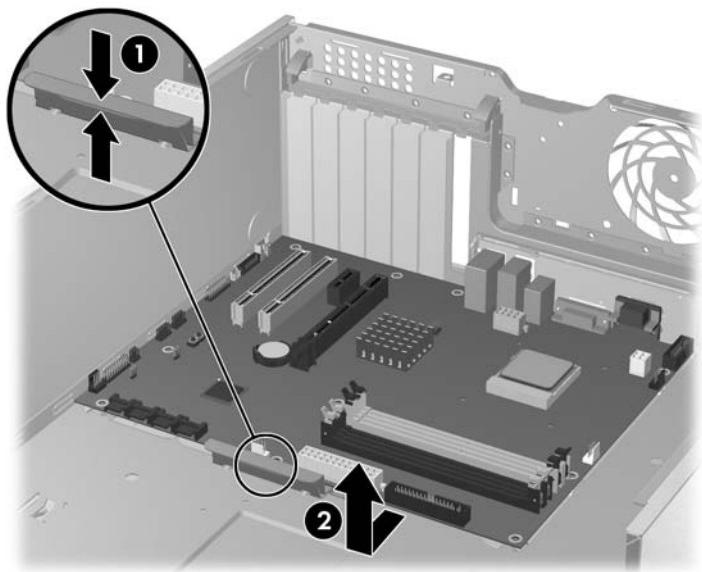
NOTE: Make note of the cable connections before disconnecting them from the system board. Refer to [Workstation power connections to drives and the system board on page 75](#) for more information.

NOTE: It is not necessary to remove the processor heatsink before removing the system board.

3. Press the release tab (1) as shown in the following illustration.

4. Slide the system board toward the front of the chassis and then lift it (2) out of the workstation.

Figure 4-53 Removing the system board



To replace the system board:

1. Lay the system board back in the chassis slightly away from the rear of the chassis. The mounting hooks should fall into the recesses of the tray so the tray lays flat on the chassis base.
2. Slide the tray towards the rear of the chassis until the heatsink mounting holes align.
3. Reinstall the processor heatsink, cards, and cables.

Product recycling

HP Planet Partners recycling service provides an easy method to recycle computer equipment, rechargeable batteries or HP printing supplies. HP processes ensure that unwanted hardware or empty HP printing supplies are recycled responsibly.

For information on recycling HP components or products, see: <http://www.hp.com/go/recycle>.

5 System diagnostics and troubleshooting

This chapter discusses the tools available for diagnosing and troubleshooting system issues.

- [Customer self help on page 97](#)
- [Troubleshooting checklist on page 114](#)
- [LED color definitions on page 114](#)
- [HP Insight Diagnostics Offline Edition on page 115](#)
- [POST error messages on page 119](#)

Customer self help

This section provides information on the following areas of customer self help:

- Help and Support Center
- HP SoftPaq Download Manager
- Diagnostic error codes
- Troubleshooting scenarios and solutions

Help and Support Center

The Help and Support Center (HSC) provides online access to technical support information, software updates and downloads, diagnostic tools, and HP support contact information.

To open HSC from your desktop, select **Start>Help and Support**.

HSC contains four sections:

- HP Product Information (requires Internet access) – Links to the HP Technical Support Web site for your product. You can access all related documentation, downloads and updates, tools, and more.
- HP Software and Driver Downloads (requires Internet access) – Links to HP specific software downloads and updates.
- HP Support Tools (requires Internet access) – Links to self-help tools and diagnostics offered by HP Instant Support Professional Edition.
- Contact HP for Support (does not require Internet access) – Provides two different options:
 - Chat with an expert online (requires Internet access) – Provides a tool to communicate with a support specialist online through **Active Chat**.
 - Call a support agent – Provides hardware details about the workstation and HP support contact phone number worldwide.

HP SoftPaq Download Manager

The HP SoftPaq Download Manager enables you to download software updates for your workstation from the HP support site. To use the download manager:

1. See <http://h20331.www2.hp.com/Hpsub/cache/509658-0-0-225-121.html>.
2. Select the desired workstation model, operating system, and language, then click **Find Available SoftPaqs**. All available SoftPaqs matching the selected criteria are displayed.
3. Check the updates you wish to download.
4. Click the **Download** button.

Diagnostic error codes

This section provides an overview of the diagnostic LEDs and error codes that are related to your workstation.

 **NOTE:** The diagnostic beeps are audible through the chassis speaker. Both the flashing LEDs and audible beeps repeat for five cycles. Following that, only the flashing LEDs continue to repeat.

Table 5-1 Diagnostic LED codes

Chassis indicator LEDs	
Power LED and audible beep activity	Diagnosis and service action
None	<p>System does not power on. Press the power button. If HDD LED = GREEN, then:</p> <ol style="list-style-type: none">1. Remove expansion cards one at a time.2. Replace the system board. <p>OR</p> <p>Press the power button. If HDD LED does not illuminate, then:</p> <ol style="list-style-type: none">1. Verify that the workstation is plugged into a working AC outlet.2. Open access panel and verify that the power button harness is properly connected to the inline front panel I/O device assembly connector.3. Verify that the power supply cables are properly connected to the system board.
Blinks red 2 times, once per second, then 2-second pause, 2 beeps	<p>Thermal shutdown has occurred:</p> <ol style="list-style-type: none">1. Ensure that the workstation air vents are not blocked and the cooling fan is running.2. Open the access panel, press power button, and determine whether the processor fan spins. If it does not spin, ensure the fan cable is plugged into the system board. Ensure that the fan is properly seated.3. If the fan is plugged in and seated but not spinning, then replace processor fan.4. Reseat the processor heatsink and verify that the fan assembly properly attached.
Blinks red 3 times, once per second, then 2-second pause, 3 beeps	<p>Processor not installed.</p> <ol style="list-style-type: none">1. Install processor.2. Reseat processor.

Table 5-1 Diagnostic LED codes (continued)

Chassis indicator LEDs	
Power LED and audible beep activity	Diagnosis and service action
Blinks red 4 times, once per second, then 2-second pause, 4 beeps	<p>Power supply failure.</p> <ol style="list-style-type: none">1. Open the access panel and ensure the four-wire power supply cable is properly connected to the system board power connector P3.2. Locate faulty device by removing all devices and then reinstalling one at a time until workstation fails. Replace the device causing the failure. Continue adding devices to ensure all are functioning properly.
Blinks red 5 times, once per second, then 2-second pause, 5 beeps	<p>Pre-video memory error.</p> <ol style="list-style-type: none">1. Reseat memory modules.2. Replace memory modules one at a time to find the faulty module.3. Replace third-party modules with HP memory.4. Replace system board.
Blinks red 6 times, once per second, then 2-second pause, 6 beeps	<p>Pre-video graphic card error. For systems with integrated graphics, replace system board. For systems with graphic cards:</p> <ol style="list-style-type: none">1. Reseat the graphic card. Power on the system.2. Replace the graphic card.3. Replace the system board.
Blinks red 7 times, once per second, then 2-second pause, 7 beeps.	System board failure (ROM detected failure before video). Replace system board.
Blinks red 8 times, once per second, then 2-second pause, 8 beeps	<p>Invalid ROM based on bad checksum.</p> <ol style="list-style-type: none">1. Reflash ROM.2. Replace system board.
Blinks red 9 times, once per second, then 2-second pause, 9 beeps	<p>System powers on but is unable to boot.</p> <ol style="list-style-type: none">1. Replace the system board.2. Replace the processor.

Troubleshooting scenarios and solutions

This section presents an extensive overview of various troubleshooting scenarios and includes possible solutions for each.

Solving minor problems

Table 5-2 Minor problems

Problem	Cause	Possible Solution
Workstation appears locked up and will not shut down when the power button is pressed.	Software control of the power switch is not functional.	<ol style="list-style-type: none">1. Press and hold the power button for at least four seconds until the workstation shuts down.2. Disconnect electrical plug from outlet.

Table 5-2 Minor problems (continued)

Problem	Cause	Possible Solution
Workstation seems to be locked up.	Program in use has stopped responding to commands.	<ol style="list-style-type: none">1. Attempt the normal Windows shutdown procedure.2. Restart the workstation using the power button.
Workstation date and time display is incorrect.	Real-time clock (RTC) battery might need to be replaced.	<ol style="list-style-type: none">1. Reset the date and time under Control Panel.2. Replace the RTC battery.
Workstation appears to pause periodically.	Network driver is loaded and no network connection is established.	Establish a network connection, or use the Computer Setup (F10) Utility or Microsoft Windows Device Manager to disable the network controller.
Cursor will not move using the arrow keys on the keypad.	The Num Lock key might be on.	Press the Num Lock key. The Num Lock key can be disabled (or enabled) in Computer Setup.
Poor performance is experienced.	Processor is hot.	<ol style="list-style-type: none">1. Ensure airflow to the workstation is not blocked.2. Ensure the fans are connected and working properly (some fans only operate when needed).3. Ensure the processor heatsink is installed properly.
	Hard drive is full.	Transfer data from the hard drive to create more space on the hard drive.
Workstation powered off automatically and the Power LED flashes red 2 times, once every second, followed by a 2-second pause, and two simultaneous audible beeps.	<p>Processor thermal protection activated.</p> <p>A fan might be blocked or not turning.</p> <p>OR</p> <p>The processor heatsink is not properly attached to the processor.</p>	<ol style="list-style-type: none">1. Be sure workstation air vents are not blocked and the cooling fan is running.2. Open the access panel, press the power button, and see if the processor fan spins. If not spinning, be sure the fan cable is plugged into the system board header. Ensure the fan is fully and properly seated or installed.3. Replace the processor fan.4. Reseat processor heatsink and verify that the fan assembly is properly attached.
System does not power on, and the LEDs on the front of the workstation are not flashing.	System unable to power on.	<p>Press and hold the power button for less than 4 seconds. If the hard drive LED turns green, then:</p> <ol style="list-style-type: none">1. Remove the expansion cards.2. Replace the system board. <p>OR Press and hold the power button for less than 4 seconds. If HDD LED does not illuminate, then:</p> <ol style="list-style-type: none">1. Verify that the workstation is plugged into a working AC outlet.2. Open the workstation access panel and verify that the power button harness is properly connected to the inline front panel I/O device assembly connector.3. Verify that the power supply cables are properly connected to the system board.

Solving power supply problems

This section presents troubleshooting information for power supply problems.

Table 5-3 Power supply problems

Problem	Cause	Solution
Power supply shuts down intermittently.	Power supply fault.	Replace the power supply.
After AC power is applied, system powers up for 2-3 seconds and then powers down.	This behavior is normal. The system is restoring WOL settings lost during AC power loss.	No action required. This behavior occurs whether or not WOL is enabled.
Workstation powered off automatically and the Power LED flashes red 2 times, once every second, followed by a 2-second pause.	<p>Processor thermal protection activated.</p> <p>A fan might be blocked or not turning.</p> <p>OR</p> <p>The processor heatsink fan assembly is not properly attached to the processor.</p>	<ol style="list-style-type: none"> 1. Be sure that the workstation air vents are not blocked and the cooling fan is running. 2. Open the access panel, press the power button, and determine whether the processor fan spins. If the processor fan is not spinning, be sure the fan's cable is plugged into the system board header. Be sure the fan is properly seated or installed. 3. Replace the processor fan. 4. Reseat processor heatsink and verify that the fan assembly is properly attached.
Power LED flashes red 4 times, once every 2 seconds.	Power failure (power supply is overloaded).	Determine if a device is causing the problem: Power off the workstation, remove all attached devices, and power on the workstation. If the workstation enters the POST, power off the workstation, reinstall one of the removed devices, and power on the workstation again. If the workstation continues to enter the POST, power off the workstation, reinstall the next device that was removed, and power on the workstation. Repeat this procedure until failure occurs with the most recently reinstalled device. Replace the device causing the failure. Continue adding devices one at a time to ensure all devices are functioning properly.

Solving diskette problems

Table 5-4 Diskette problems

Problem	Cause	Solution
Diskette drive light stays on.	Diskette is damaged.	In Microsoft Windows Vista or XP, right-click Start , click Explore , and select a drive. Select File>Properties>Tools . Under Error-checking , click Check Now .
	Diskette is incorrectly inserted.	Remove and reinsert diskette.
	Files on diskette are damaged.	Verify the program diskettes.
	Drive cable is not properly connected.	Reconnect power cable. Verify that all four pins are connected.
Drive not found.	Cable is loose.	Reseat diskette drive data and power cables.
	Removable drive is not seated properly.	Reseat the drive.
Diskette drive cannot write to a diskette.	Diskette is not formatted.	Format the diskette.
	Diskette is write-protected.	Use another diskette or remove the write protection.

Table 5-4 Diskette problems (continued)

Problem	Cause	Solution
	Writing to the wrong drive.	Verify the drive letter in the path statement.
	Not enough space is left on the diskette.	Use another diskette.
	Diskette write control is enabled.	Use the Computer Setup (F10) Utility to verify the storage security feature disabled settings.
	Diskette is damaged.	Replace the damaged disk.
Cannot format diskette.	Invalid media reported.	When formatting a disk in MS-DOS, you might need to specify diskette capacity. For example, to format a 1.44-MB diskette, enter the following command at the MS-DOS prompt: FORMAT A: /F:1440
A problem has occurred with a disk transaction.	The directory structure is bad, or there is a problem with a file.	In Windows Vista or XP, right-click Start , click Explore , and select a drive. Select File>Properties>Tools . Under Error-checking, click Check Now .
Diskette drive cannot read a diskette.	Diskette is not formatted.	Format the diskette.
	You are using the wrong diskette type for the drive type.	Verify the type of drive that you are using and use the correct diskette type.
	You are reading the wrong drive.	Verify the drive letter in the path statement.
	Diskette is damaged.	Replace the diskette with a new one.
"Invalid system disk" message is displayed.	A diskette that does not contain the system files needed to start the workstation has been inserted in the drive.	When drive activity stops, remove the diskette and press the Spacebar . The workstation should start up.
	Diskette error has occurred.	Restart the workstation by pressing the power button.
Cannot Boot to Diskette.	Diskette is not bootable.	Replace with a bootable diskette.
	Diskette boot has been disabled in Computer Setup.	Run the Computer Setup (F10) Utility and enable diskette boot in Storage>Boot Order .
	Removable media boot has been disabled in Computer Setup.	Run the Computer Setup (F10) Utility and enable Removable Media Boot in Storage>Storage Options .
	Diskette MBR validation is enabled.	Run the Computer Setup (F10) Utility and disable Diskette MBR Validation in Storage>Storage Options .

Solving hard drive problems

Table 5-5 Hard drive problems

Problem	Cause	Solution
Hard drive error occurs.	Hard disk has bad sectors or has failed.	Use a utility to locate and block usage of bad sectors. If necessary, reformat the hard disk. Or, run DPS Self-test if the drive is detected by the BIOS.
Disk transaction problem.	The directory structure is bad, or there is a problem with a file.	Right-click Start , click Explore , and select a drive. Select File>Properties>Tools . Under Error-checking, click Check Now .

Table 5-5 Hard drive problems (continued)

Problem	Cause	Solution
Drive not found (identified).	Loose cable.	Verify cable connections.
	The system might not have automatically recognized a newly installed device.	<ol style="list-style-type: none"> Run the Computer Setup (F10) Utility. If the system still does not recognize the new device, verify to see if the device is listed within Computer Setup. If it is listed, the probable cause is a driver problem. If it is not listed, the probable cause is a hardware problem. If this drive is newly installed, enter Setup and try adding a POST delay under Advanced>Power-On.
	Drive jumper settings might be incorrect.	If the drive is a secondary drive that has just been installed on the same cable as the primary drive, verify that the jumpers for both drives are set correctly.
	Drive responds slowly immediately after power-up.	Run the Computer Setup (F10) Utility and increase the POST Delay in Advanced>Power-On Options .
Non-system disk/NTLDR missing message.	System is trying to start from a non-bootable diskette.	Remove the diskette from the diskette drive.
Non-system disk/NTLDR missing message.	System is trying to start from a damaged hard drive.	<ol style="list-style-type: none"> Insert a bootable diskette into the diskette drive and restart the workstation. If the hard drive is still inaccessible and MBR Security is enabled, try restoring the previously saved MBR image by entering Setup and selecting Security>Restore Master Boot Record.
	System files missing or not properly installed.	<ol style="list-style-type: none"> Insert a bootable system diskette and restart. Verify that the hard drive is partitioned and formatted. Install system files for the appropriate operating system if necessary.
	Hard drive boot disabled in Computer Setup.	Run the Computer Setup (F10) Utility and enable the hard drive entry in the Storage>Boot Order list.
Workstation will not start.	Hard drive is damaged.	Observe the beeps and LEDs on the front of the workstation. Refer to POST error messages on page 119 .

Solving display problems

Table 5-6 Display problems

Problem	Cause	Solution
Blank screen (no video).	The cable connections are not correct.	Verify the cable connections from the monitor to the workstation and to a working electrical outlet.
	The monitor is off.	Switch the monitor to on (LED is on). You might need to refer to the monitor manual for an explanation of the LED signals.
	Screen blanking utility installed or energy saver features enabled.	Press any key or click the mouse button, and, if set, enter your password.

Table 5-6 Display problems (continued)

Problem	Cause	Solution
	System ROM is bad; system is running in FailSafe Boot Block mode (indicated by 8 beeps).	Reflash the ROM using SoftPaq. You can reflash the ROM, using the latest SoftPaq images downloaded from http://www.hp.com/support/workstation_swdrivers
	Fixed-sync monitor will not sync at the resolution chosen.	Be sure that the monitor can accept the same horizontal scan rate as the resolution chosen.
	Computer is in Hibernate mode.	Press the power button to resume from Hibernate mode.
	Monitor settings in the workstation are not compatible with the monitor.	<ol style="list-style-type: none">1. Restart the workstation and press F8 during startup when you see Press F8 in the bottom-right corner of the screen.2. Use the keyboard arrow keys to select Enable VGA Mode and press Enter.3. In Windows Control Panel, double-click the Display icon and select the Settings tab.4. Use the sliding control to reset the resolution.
The display works properly during the POST but goes blank when the operating system starts.	The display settings in the operating system are incompatible with your graphics card and monitor.	<ol style="list-style-type: none">1. Restart your workstation in VGA mode.2. After the operating system starts, change the display settings to match those supported by your graphics card and monitor.3. Refer to your operating system and graphics card documentation for information on changing display settings.
Power LED flashes red 6 times, once every second, followed by a 2-second pause, and the workstation beeps 6 times.	Pre-video graphics error.	For systems with a graphics card: <ol style="list-style-type: none">1. Reseat the graphics card.2. Replace the graphics card.3. Replace the system board.
Monitor does not function properly when used with energy saver features.	Monitor without energy saver capabilities is being used with energy saver features enabled.	Disable monitor energy saver feature.
Dim characters.	The brightness and contrast controls are not set properly.	Adjust the monitor brightness and contrast controls.
	Cables are not properly connected.	Verify that the graphics cable is securely connected to the graphics card and the monitor.
Blurry video or requested resolution cannot be set.	If the graphics controller was upgraded, the correct video drivers might not be loaded.	Install the video drivers included in the upgrade kit.
	Monitor is not capable of displaying requested resolution.	Change requested resolution.

Table 5-6 Display problems (continued)

Problem	Cause	Solution
The picture is fragmented, rolls, jitters, or flashes.	The monitor connections might be incomplete, or the monitor might be incorrectly adjusted.	<ol style="list-style-type: none"> 1. Ensure the monitor cable is securely connected to the workstation. 2. In a two-monitor system or if another monitor is in close proximity, ensure the electromagnetic field of each monitor is not interfering with the other monitor by moving them further from each other. 3. Fluorescent lights or fans might be too close to the monitor.
	Monitor must be degaussed.	Degauss the monitor.
Vibrating or rattling noise coming from inside a CRT monitor when powered on.	Monitor degaussing coil has been activated.	None. It is normal for the degaussing coil to be activated when the monitor is powered on.
Clicking noise coming from inside a CRT monitor.	Electronic relays have been activated inside the monitor.	None. It is normal for some monitors to make a clicking noise when turned on and off, when going in and out of Standby mode, and when changing resolutions.
High pitched noise coming from inside a flat-panel monitor.	Brightness and contrast settings are too high.	Lower brightness and contrast settings.
Fuzzy focus; streaking, ghosting, or shadowing effects; horizontal scrolling lines; faint vertical bars; or unable to center the picture on the screen. (Flat-panel monitors using an analog VGA input connection only.)	Flat-panel monitor internal digital conversion circuits might be unable to correctly interpret the output synchronization of the graphic card.	<ol style="list-style-type: none"> 1. Select the monitor Auto-Adjustment option in the monitor on-screen display menu. 2. Manually synchronize the Clock and Clock Phase on-screen display functions. Download SoftPaq SP20930 or SP22333, depending on the monitor, to assist with the synchronization. You can download the most recent SoftPaq release from: http://www.hp.com/support/workstation_swdrivers
Certain typed symbols do not appear correctly.	The font you are using does not support that particular symbol.	Use the Character Map to locate the and select the appropriate symbol. Click Start>All Programs>Accessories>System Tools>Character Map . You can copy the symbol from the Character Map into a document.

Solving audio problems

Table 5-7 Audio problems

Problem	Cause	Solution
Sound does not come out of the speaker or headphones.	Software volume control is turned down.	Double-click the Speaker icon on the taskbar and use the volume slider to adjust the volume.
	The external speakers are not turned on.	Turn on the external speakers.
	External speakers plugged into the wrong audio jack.	See the sound card documentation for proper speaker connection.
	Audio cable not connected.	Connect audio cable between DVD-ROM drive and the system board.
	Digital CD audio is not enabled.	<p>Enable digital CD audio:</p> <ol style="list-style-type: none"> 1. From the Control Panel, select System. 2. On the Hardware tab, click the Device Manager button.

Table 5-7 Audio problems (continued)

Problem	Cause	Solution
		<p>3. Right-click the CD/DVD device and select Properties.</p> <p>4. On the Properties tab, be sure Enable digital CD audio for this CD-ROM device is selected.</p>
	Headphones or devices connected to the line-out connector mute the internal speaker.	Turn on and use headphones or external speakers, if connected, or disconnect headphones or external speakers.
	Volume is muted.	<p>1. From the Control Panel program, click Sound, Speech and Audio Devices, then click Sounds and Audio Devices.</p> <p>2. Click the Mute checkbox to remove the checkmark from the box.</p>
	Computer is in Standby mode.	Press the power button to resume from Standby mode.
Noise or no sound comes out of the speakers or headphones.		<p>1. If using digital speakers that have a stereo jack and want the system to auto-switch to digital, use a stereo-to-mono adapter to properly engage the auto-sense feature or use the multimedia device properties to manually switch the audio signal from analog to digital.</p> <p>2. If the headphones have a mono jack, use the multimedia device properties to switch the system to analog out.</p>
NOTE: If you set digital as the Output Mode , the internal speaker and external analog speakers will no longer output audio until you switch back to an auto-sense or analog mode.		
If you set analog as the Output Mode , external digital speakers will not function until you change the output mode back to an auto-sense or digital mode.		
The sound occurs intermittently.	Processor resources are being used by other open applications.	Shut down all open processor-intensive applications.
Workstation appears to be locked up while recording audio.	The hard disk might be full.	<p>1. Before recording, be sure there is enough free space on the hard disk.</p> <p>2. Try recording the audio file in a compressed format.</p>

Solving printer problems

Table 5-8 Printer problems

Problem	Cause	Solution
Printer does not print.	Printer is not turned on and online.	Turn the printer on and be sure it is online.
	The correct printer driver for the application is not installed.	<p>1. Install the correct printer driver for the application.</p> <p>2. Try printing using the MS-DOS command: DIR C:\> [printer port] where [printer port] is the address of the printer being used. If the printer works, reload the printer driver.</p>

Table 5-8 Printer problems (continued)

Problem	Cause	Solution
	If you are on a network, you might not have made the connection to the printer.	Make the proper network connections to the printer.
	Printer might have failed.	Run printer self-test.
Printer does not turn on.	The cables might not be connected properly.	Reconnect all cables.
Printer prints garbled information.	The correct printer driver is not installed.	Install the correct printer driver for the application.
	The cables might not be connected properly.	Reconnect all cables.
	Printer memory might be overloaded.	Reset the printer by turning it off for one minute, then turn it back on.
Printer is offline.	The printer might be out of paper.	<ol style="list-style-type: none">1. Verify the paper tray and refill it if it is empty.2. Select online.

Solving keyboard and mouse problems

Table 5-9 Keyboard and mouse problems

Problem	Cause	Solution
Keyboard commands and typing are not recognized by the workstation.	Keyboard connector is not properly connected.	<ol style="list-style-type: none">1. Power off the workstation.2. Reconnect the keyboard to a workstation USB connector and restart the workstation.
	Program in use has stopped responding to commands.	Shut down the workstation using the mouse, and then restart the workstation.
	Keyboard needs repairs.	Replace the keyboard.
	Keyboard key is stuck down.	Remove any debris from the keyboard.
	Workstation is in Hibernate mode.	Press the power button to resume from Hibernate mode.
Cursor will not move using the arrow keys on the keypad.	The Num Lock key might be on.	Press the Num Lock key. The Num Lock light should not be on if you want to use the arrow keys. The Num Lock key can be disabled or enabled in the Computer Setup (F10) Utility.
Mouse does not respond to movement or is too slow.	Mouse connector is not properly plugged into the back of the workstation.	<ol style="list-style-type: none">1. Shut down the workstation using the keyboard.2. Connect the mouse to a workstation USB connector and restart the workstation.
	Program in use has stopped responding to commands.	Shut down the workstation using the keyboard and then restart the workstation.
	Mouse needs repairs.	Replace the mouse.
	Workstation is in Standby mode.	Press the power button to resume from Standby mode.
Mouse will only move vertically or horizontally, or movement is jerky.	Mouse roller ball is dirty.	Remove roller ball cover from the bottom of the mouse and clean the ball. Then, replace cover.

Solving front panel component problems

If you are experiencing problems with one of the front panel ports, you might be able to try your device in the corresponding port on the rear of the computer. If this does not correct the problem or you must use the front panel ports, continue troubleshooting.

Some problems in this section are also discussed in other troubleshooting suggestions in this chapter.

Table 5-10 Front panel component problems

Problem	Cause	Solution
A USB device, headphone, or microphone is not recognized by the workstation.	The device is not properly connected.	<ol style="list-style-type: none">1. Power off the workstation.2. Reconnect the device to the front of the workstation and restart the workstation.
	The device does not have power.	If the USB device requires AC power, be sure one end is connected to the device and one end is connected to a live outlet.
	The correct device driver is not installed.	<ol style="list-style-type: none">1. Install the correct driver for the device.2. You might need to reboot the workstation.
	The cable from the device to the computer does not work.	<ol style="list-style-type: none">1. If possible, replace the cable.2. Restart the workstation.
	The device is not working.	<ol style="list-style-type: none">1. Replace the device.2. Restart the workstation.
A USB, audio, or IEEE-1394 devices is not working.	The internal cables might not be connected to the system board or the PCI card.	<ol style="list-style-type: none">1. Power off the workstation.2. Connect the cables correctly.
A device in the IEEE-1394 port is not responsive.	Cables of new external device are loose, or power cables are unplugged.	Ensure that all cables are properly and securely connected.
	The power switch on the device is not turned on.	Power off the workstation, power on the external device, then power on the workstation to integrate the device with the workstation system.
The IEEE-1394 port is not active.	The port is not there because it was not purchased with the system.	You can purchase an IEEE 1394 PCI adapter card. Contact an HP seller.

Solving hardware installation problems

You might need to reconfigure the workstation when you add or remove hardware, such as an additional diskette drive. If you install a Plug and Play (PnP) device, the operating system automatically recognizes the device and configure the workstation. If you install a non-PnP device, you must reconfigure the workstation after completing installation of the new hardware.

Table 5-11 Hardware installation problems

Problem	Cause	Solution
A new device is not recognized as part of the system.	Device is not seated or connected properly.	Ensure that the device is properly and securely connected and that pins in the connector are not bent down.

Table 5-11 Hardware installation problems (continued)

Problem	Cause	Solution
	Cables of new external device are loose, or power cables are unplugged.	Ensure that all cables are properly and securely connected and that pins in the cable or connector are not bent down.
	Power switch of new external device is not turned on.	Power off the workstation, power on the external device, then power on the workstation to integrate the device with the workstation system.
	When the system advised you of changes to the configuration, you did not accept them.	Reboot the workstation and follow the instructions for accepting the changes.
	A PnP board might not automatically configure when added if the default configuration conflicts with other devices.	Use Device Manager to deselect the automatic settings for the board and choose a basic configuration that does not cause a resource conflict. You can also use the Computer Setup (F10) Utility to reconfigure or disable devices to resolve the resource conflict.
	Device hardware is not properly jumpered or otherwise configured.	Read the device-specific configuration information and check for incorrect settings or conflicts with other devices already installed in the system.
Workstation will not start.	Incorrect memory modules were used in the upgrade, or memory modules were installed in the incorrect location.	<ol style="list-style-type: none"> Review the documentation that came with the system to determine if you are using the correct memory modules and to verify the proper installation. Observe the beeps and LEDs on the front of the workstation. Refer to POST error messages on page 119 to determine possible causes.
	PCI Express power cable might be plugged into the wrong connector on the system board.	Connect the auxiliary PCI Express power cable to the PCI Express card.
Power LED flashes red 5 times, once every second, followed by a 2-second pause, and the workstation beeps 5 times.	Memory is installed incorrectly or is bad.	<ol style="list-style-type: none"> Reseat DIMMs. Replace DIMMs one at a time to isolate the faulty module. Replace third-party memory with HP memory. Replace the system board.
Power LED flashes red 6 times, once every second, followed by a 2-second pause, and the workstation beeps 6 times.	Video card is not seated properly or is bad, or system board is bad.	<p>For systems with a graphic card:</p> <ol style="list-style-type: none"> Reseat the graphics card. Replace the graphics card. Replace the system board.

Solving network problems

These guidelines do not discuss the process of debugging the network cabling.

Table 5-12 Network problems

Problem	Cause	Solution
Wake-on-LAN feature is not functioning.	Wake-on-LAN is not enabled.	Use the Network control application to enable Wake-on-LAN.

Table 5-12 Network problems (continued)

Problem	Cause	Solution
Network driver does not detect network controller.	Network controller is disabled.	Run the Computer Setup and enable network controller.
	Incorrect network driver.	Verify the network controller documentation for the correct driver or obtain the latest driver from the manufacturer website.
Network status link light does not illuminate or it never flashes.	No active network is detected.	Verify cabling and network equipment for proper connection.
The network status light should flash when there is network activity.	Network controller is not set up properly.	Use the Network control application to verify that the device is working properly.
	Network driver is not properly loaded.	Reinstall network drivers.
	System cannot auto-sense the network.	Disable auto-sensing capabilities and force the system into the correct operating mode.
Diagnostics reports a failure.	The cable is not securely connected.	Be sure that both ends of the data cable are securely connected.
	The cable is attached to the incorrect connector.	Be sure that the cable is attached to the correct connector.
	There is a problem with the cable or a device at the other end of the cable.	Be sure that the cable and device at the other end are operating correctly.
	Network controller interrupt is shared with an expansion board.	Under the Computer Setup (F10) Utility Advanced menu, change the resource settings for the board.
	The network controller is defective.	Replace the network interface controller (NIC).
Diagnostics passes, but the workstation does not communicate with the network.	Network drivers are not loaded, or driver parameters do not match current configuration.	<ol style="list-style-type: none">1. Ensure the network drivers are loaded and that the driver parameters match the configuration of the network controller.2. Ensure the correct network client and protocol is installed.
	The network controller is not configured for this workstation.	Double-click the Network icon in the Control Panel and configure the network controller.
Network controller stopped working when an expansion board was added to the workstation.	Network controller interrupt is shared with an expansion board.	Under the Computer Setup (F10) Utility Advanced menu, change the resource settings for the board.
	The network controller requires drivers.	Verify that the drivers were not accidentally deleted when the drivers for a new expansion board were installed.
	The expansion board installed is a network card and conflicts with the embedded network card.	Under the Computer Setup (F10) Utility Advanced menu, change the resource settings for the board.
Network controller stops working without apparent cause.	The files containing the network drivers are corrupted.	Reinstall the network drivers, using the <i>Restore Plus!</i> CD.
	The cable is not securely connected.	Be sure that both ends of the cable are securely attached to the correct devices.
	The network controller is defective.	Replace the NIC.

Table 5-12 Network problems (continued)

Problem	Cause	Solution
New network card will not boot.	New network card might be defective or might not meet industry-standard specifications.	Install a working, industry-standard NIC, or change the boot sequence to boot from another source.
Cannot connect to network server when attempting remote system installation.	The network controller is not configured properly.	Verify network connectivity, that a DHCP Server is present, and that the Remote System Installation Server contains the NIC drivers for your NIC.
System setup utility reports unprogrammed EEPROM.	Unprogrammed EEPROM.	Flash the ROM. You can download the most recent ROM images from: http://www.hp.com/support/workstation_swdrivers

Solving memory problems

△ **CAUTION:** Hewlett-Packard does not support mixing ECC and non-ECC memory. If ECC and non-ECC memory are mixed, the workstation will not boot the operating system.

Table 5-13 Memory problems

Problem	Cause	Solution
Operating system will not boot or does not function properly after installing additional memory modules.	Memory module is not the correct type or speed or the new memory module is not seated properly.	Replace module with the correct industry-standard device for the workstation.
		ECC and non-ECC memory modules cannot be mixed.
Out of memory error.	Memory configuration might not be correct.	Use the Device Manager to verify memory configuration.
	You have run out of memory to run the application.	Verify the application documentation to determine the memory requirements.
Memory count during POST is incorrect.	The memory modules might not be installed correctly.	Verify that the memory modules have been installed correctly and that proper modules are used.
Insufficient memory error during operation.	Excess Terminate and Stay Resident programs (TSRs) are installed.	Delete any TSRs that you do not need.
	You have run out of memory for the application.	Verify the memory requirements for the application or add more memory to the workstation.
Power LED flashes red 5 times, once every second, followed by a 2-second pause, and the workstation beeps 5 times.	Memory is installed incorrectly or is faulty.	<ol style="list-style-type: none">1. Reseat DIMMs.2. Replace DIMMs one at a time to isolate the faulty module.3. Replace third-party memory with HP memory.4. Replace the system board.

Solving processor problems

Table 5-14 Processor problems

Problem	Cause	Solution
Poor performance is experienced.	Processor is hot.	<ol style="list-style-type: none">1. Ensure the airflow to the workstation is not blocked.2. Ensure the fans are connected and working properly (some fans only operate when needed).3. Ensure the processor heatsink is installed properly.
Power LED is red and stays on.	Processor is not seated properly or not installed.	<ol style="list-style-type: none">1. Verify that the processor is present.2. Reseat the processor.

Solving DVD problems

Table 5-15 DVD problems

Problem	Cause	Solution
Workstation will not boot from DVD drive.	The DVD boot is not enabled through the Computer Setup (F10) Utility.	Run the Computer Setup (F10) Utility and enable booting to removable media and verify boot order settings.
	Non-bootable CD in drive.	Try a bootable CD in the drive.
DVD devices are not detected or driver is not loaded.	Drive is not connected properly or not properly configured.	<ol style="list-style-type: none">1. Reconnect power and data cables to the drive.2. Install correct device driver.
Movie will not play in the DVD drive.	Movie might be regionalized for a different country.	See the documentation that came with the DVD drive.
	Decoder software is not installed.	Install decoder software.
Cannot eject CD (tray-load unit).	CD not properly seated in the drive.	<ol style="list-style-type: none">1. Power off the workstation and insert a thin metal rod into the emergency eject hole and push firmly.2. Slowly pull the tray out from the drive until the tray is fully extended, then remove the disc.
CD-RW, DVD-ROM, or DVD-R/RW drive cannot read a disc or takes too long to start.	CD has been inserted upside down.	Reinsert the CD with the label facing up.
	The DVD-ROM drive takes longer to start because it has to determine the type of media played, such as audio or video.	Wait at least 30 seconds to let the DVD-ROM drive determine the type of media being played. If the disc still does not start, read the other solutions listed for this topic.
	CD or DVD disc is dirty.	Clean CD or DVD with a CD cleaning kit.

Table 5-15 DVD problems (continued)

Problem	Cause	Solution
	Windows does not detect the DVD-ROM drive.	<ol style="list-style-type: none"> 1. Use Device Manager to remove or uninstall the device in question. 2. Restart the workstation and let Windows detect the device.
Recording audio CDs is difficult or impossible.	Wrong or poor quality media type.	<ol style="list-style-type: none"> 1. Use a slower recording speed. 2. Verify that you are using the correct media for the drive. 3. Try a different brand of media. Quality varies widely between manufacturers.

Solving Internet access problems

Table 5-16 Internet access problems

Problem	Cause	Solution
Unable to connect to the Internet.	Internet Service Provider (ISP) account is not set up properly.	Verify Internet settings or contact the ISP for assistance.
	Modem is not set up properly.	Reconnect the modem. Verify the connections are correct using the quick setup documentation.
	Web browser is not set up properly.	Verify that the web browser is installed and set up to work with your ISP.
	Cable/ DSL modem is not plugged in.	Plug in cable/DSL modem. You should see a "power" LED on the front of the cable/DSL modem.
	Cable/DSL service is not available or has been interrupted because of bad weather.	Try connecting to the Internet at a later time or contact your ISP. (If the cable/DSL service is connected, the "cable" LED light on the front of the cable/DSL modem will be on.)
	The CAT5 10/100/1000 cable is disconnected.	Connect the CAT5 10/100/1000 cable between the cable modem and the workstations RJ-45 connector. (If the connection is good, the "PC" LED on the front of the cable/DSL modem will illuminate.)
	IP address is not configured properly.	Contact the ISP for the correct IP address.
	Cookies are corrupted.	<ol style="list-style-type: none"> 1. Select Start>Control Panel. 2. Double-click Internet Options. 3. On the General tab, click the Delete Cookies button.
Cannot automatically launch Internet programs.	You must log on to the ISP before some programs will start.	Log on to the ISP and launch the desired program.
Internet takes too long to download websites.	Modem is not set up properly.	<ol style="list-style-type: none"> 1. Select Start>Control Panel. 2. Continue with step #2. 3. Double-click System. Click the Hardware tab. 4. In the Device Manager area, click the Device Manager button. 5. Double-click Ports (COM & LPT).

Table 5-16 Internet access problems (continued)

Problem	Cause	Solution
		<ol style="list-style-type: none">6. Right-click the COM port your modem uses, then click Properties.7. Under Device status, verify that the modem is working properly.8. Under Device usage, verify the modem is enabled.9. If there are further problems, click the Troubleshoot button and follow the on-screen instructions.

Troubleshooting checklist

Before running any of the diagnostic utilities, use the following checklist to find possible solutions for workstation or software problems.

- Are the workstation and monitor connected to a working electrical outlet?
- Is the workstation powered on?
- Is the green power light illuminated?
- Is the monitor powered on?
- Is the green monitor light illuminated?
- Adjust the monitor brightness and contrast controls if the monitor is dim.
- Press and hold any key. If the system beeps, then the keyboard is operating correctly.
- Check all cables for loose or incorrect connections.
- Reconfigure the workstation after installing a non-Plug and Play expansion board or other option, such as a diskette drive.
- Are all of the necessary device drivers installed?
- Have all printer drivers been installed for each application?
- Remove all diskettes and CDs from the drives before you apply power to the system.
- Ensure your workstation is running the latest BIOS version, drivers, and software updates.

LED color definitions

A multicolor LED is located on the front panel of your workstation. The following table describes the significance of each LED color.

Table 5-17 LED color definitions

LED state	LED color	System status
Solid	Green	System is on.
Flashing	Green	System is in Standby.
Solid or flashing	Red	System has experienced an error. Refer to Diagnostic error codes on page 98
None	No light	System is in Hibernate, or it is off.

HP Insight Diagnostics Offline Edition

The HP Insight Diagnostics utility enables you to perform diagnostic testing and to view critical computer hardware and software configuration information from various sources.

Key features and benefits

The HP Insight Diagnostics utility simplifies the process of effectively identifying, diagnosing, and isolating the hardware issues, and helps provide a higher level system availability. In addition to robust management tools, it also provides service tools can be invaluable in quickly resolving system problems.

You can use the HP Insight Diagnostics tool to streamline the service process and help resolve problems quickly by providing the detailed information required at the time you place a service call. The primary information requirement (the information that provides the greatest insight into potential system issues) is the configuration of the system. Typical uses of the HP Insight Diagnostics tool are:

- Testing and diagnosing apparent hardware failures.
- Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance.
- Sending configuration information to another location for more in-depth analysis.

Theory of operation

Insight Diagnostics Offline Edition operates in offline mode only. The operating system is not running and software information from the system is not available to the diagnostics. The utility Offline Survey, however, is available to display the current system configuration.

The Insight Diagnostics Test feature provides the capability to test the functionality of all the major hardware components in the system. The Test feature is designed to be flexible to enable you to customize test selections by providing different modes and types of testing. Test modes include the following:

- **Quick Test** provides a predetermined script where a sample of each hardware component is exercised and requires no user intervention.
- **Complete Test** provides a predetermined script during which each hardware component is fully tested. You can select Interactive or Unattended tests. This will change the devices tested during the Complete Test. There are more tests available in the interactive mode, but these require user intervention.
- **Custom Test** provides the most flexibility in controlling the testing of a system. The Custom Test mode enables you to specifically select which devices, tests, and test parameters are run. You can select tests that do not require any user interaction through the Interactive and Unattended tests modes.

Using the Diagnostic Utility on CD

HP Insight Diagnostics is available on the *Documentation Library* CD that was shipped with your workstation.

To start the diagnostic utility on the *Documentation Library* CD:

1. Power on your workstation and press the **F10** key during the initial boot process to enter the Computer Setup (F10) Utility.
2. Select your language from the list and press the **Enter** key. In the Computer Setup (F10) Utility menu, four headings are displayed: **File**, **Storage**, **Security**, and **Advanced**. There may be other headings depending on the workstation.
3. Use the right arrow key to select **Storage**.
4. Use the down arrow key to select **Boot Order**, and press **Enter**.
5. Select **CD-ROM Drive** and enable it as a bootable device by pressing the **F5** key . Default setting is Enabled.

 **NOTE:** The **F5** key is an enable/disable toggle control. Pressing the **F5** key again disables the device.

6. Set the CD-ROM Drive to the top of the boot order. To do this, select **CD-ROM**, press the **Enter** key, and use the up arrow to move it to the top of the boot order.
7. To apply and save changes, press the **F10** key, and select **File>Save Changes** and **Exit**
8. Insert the *Documentation Library* CD into the workstation.
9. Restart your system to automatically launch the HP Insight Diagnostics tool.

Downloading the latest diagnostic utility

To download the latest diagnostic utility, complete the following:

1. See Web site:http://www.hp.com/support/workstation_swdrivers.
2. Click the **Support & Drivers** link.
3. Select the **Download driver and software** radio button.
4. Enter your product number (xw4550) in the text box and press the **Enter** key.
5. Select your operating system.
6. Click the **Diagnostic** link.
7. Locate **HP Insight Diagnostics Offline** and click **Download**.

The HP Insight Diagnostic User Interface

The Insight Diagnostics home page contains the following tabs, which separate the major functions of Insight Diagnostics.

- **Survey**
- **Test**
- **Status**
- **Help**
- **Log**

Survey tab

The **Survey** menu enables access to important system configuration information, and offers both a summary and advanced view. The **Summary** view limits the amount of data displayed, while the **Advanced** view shows all the data in the selected category. All of the following categories of information are available on the **Survey** menu:

- **Overview** - Gives you a listing of general information about the computer.
- **All** - Gives a listing of all information about the computer.
- **Architecture** - Shows the type of bus the computer uses as well as BIOS information. In addition, if the bus is PCI, information about the PCI configuration is displayed.
- **Asset Control** - Shows the serial number of the computer and also provides processor information.
- **Communication** - Shows information about the computer parallel (LPT) and serial (COM) port settings, USB, and network controller information.
- **Graphics** - Shows information about the graphics subsystem of the computer.
- **Input Devices** - Shows information about the type of keyboard and mouse.
- **Memory** - Shows information about all memory in the computer, including memory on the board and any memory modules installed.
- **Miscellaneous** - Shows information obtained from the computers configuration memory (CMOS), BIOS data area, Interrupt Vector table, and diagnostics component information.
- **Storage** - Shows information about storage media connected to the computer, including all hard drives, diskette drives, and optical drives.
- **System** - Shows product type, processor type and speed, coprocessor information, and information about all ROMs in the computer.

Test tab

The Insight Diagnostics utility provides the capability to test all the major pieces of hardware in the system. You can select from several types of tests:

- **Quick Test** - Provides a predetermined script during which a sample of most hardware components is exercised and requires no user intervention.
- **Complete Test** - Provides a predetermined script during which most hardware components are fully tested. You can select **Interactive** or **Unattended** tests. This will change the devices tested during the Complete Test. More tests are available in the interactive mode, but these require user intervention.
- **Custom Test** - Provides the most flexibility in controlling the testing of a system. The Custom Test mode enables you to specifically select which devices, tests, and test parameters are run. You can select tests that do not require any user interaction through the **Interactive** and **Unattended** test modes. More tests are available in the interactive mode, but these tests require user intervention.

To begin testing:

1. Click the **Test** tab.
2. Select **Type of Test** to perform and then select **Test Mode**, either **Interactive** or **Unattended**.

- 3.** Choose how you want the test to be executed, either **Number of Loops** or **Total Test Time**.
 - When choosing to run the test over a specified number of loops, enter the number of loops to perform.
 - If you want to run the diagnostic test for a specified time period, enter the amount of time in minutes.
- 4.** Click **Begin Testing** in the lower right corner of the display to start the test.

While tests are being performed, you can monitor the progress by viewing the Status tab. Any errors that are detected are summarized in the Error Log. Select **Save** to save the report to diskette drive or a USB Key Drive if attached.

If the diagnostics utility detects an error during a test, the user can mouse-over the failed text in the Status tab to display additional information for the type of error and the error code.

To view all test failure information, click the **Error Log**. To view the status of all testing that has been performed, click the **Log** tab.

Status tab

The Status tab displays the status of the selected tests. The type of test executed (for example, **Quick**, **Complete**, **Custom**) is displayed. The main progress bar displays the percent complete of the current set of tests. While testing is in progress, **Cancel Testing** is displayed. This selection will cancel the test job.

After testing has completed, the **Cancel** testing button is replaced with two buttons, **Select New Tests** and **Retest**. The **Select New Tests** button enables you to go back to the previous test selection page to select a new set of tests. The **Retest** button retests the last set of tests executed. This enables you to rerun the set of tests without having to go back to the test selection page.

The Status page also shows:

- The devices being tested
- The tests that are running
- The overall Test time
- The individual Test times
- The condition status of each test

Log tab

The Log tab provides of two views; Test Log and Error log:

Test Log - Displays all tests that have been executed, number of times the test has been executed, number of times the test failed, and the time it took to complete the test. The Clear Test Log button will clear the contents of the Test Log.

Error Log - Displays the tests that have failed during the diagnostic testing. Besides displaying the device and test, this section might also include error details. The description section describes the error that the diagnostic test found. The Recommended Repair will give a recommended action that should be performed to resolve the failed hardware. The error count is the number of times the test has failed. The Clear Error Log button will clear the contents of the Error Log.

Help tab

The Help tab has three views; HP Insight Diagnostics, Error Codes, and Test Components:

- **HP Insight Diagnostics**—Provides introductory and detailed information about Insight Field Diagnostics.
- **Error Codes** - Provides error code listings. It includes device tested, message, and recommended repair information.
- **Test Components** - Reloads and refreshes all components and display component details after the refresh.

POST error messages

Power On Self Test (POST) is a program run at startup that initializes and runs some tests on installed hardware. An audible and/or visual message occurs if the POST encounters a problem. The POST checks the following items to ensure that the workstation system is functioning properly:

- Keyboard
- Memory modules
- Diskette drives
- All SATA mass storage devices
- Processors
- Controllers

 **NOTE:** If the power-on password is set, a key icon appears on the screen while POST is running. To continue, you must enter the password for your workstation.

Table 5-18 POST error messages

Screen message	Probable cause	Recommended action
101—Option ROM Error	System ROM checksum.	<p>Verify the correct ROM:</p> <ol style="list-style-type: none">1. Flash the ROM if needed.2. If an expansion card was recently added, remove it and see if the problem remains.3. Clear CMOS. If the message disappears, there might be a problem with the expansion card4. Replace the system board.
102—System Board Failure	DMA, timers, and so on.	<ol style="list-style-type: none">1. Clear CMOS.2. Remove expansion boards.3. Replace the system board.
103—System Board Failure	DMA, timers, and so on.	<ol style="list-style-type: none">1. Clear CMOS.2. Remove expansion boards.3. Replace the system board.
110—Out of Memory for Option ROMs	Option ROM for a device was unable to run due to memory constraints.	Run the Computer Setup (F10) Utility and enable the ACPO/USB Buffers at Top of Memory under the Advanced>Power-On option.

Table 5-18 POST error messages (continued)

Screen message	Probable cause	Recommended action
162—System Options Not Set	Configuration incorrect. RTC battery might need to be replaced.	<ol style="list-style-type: none">1. Run Computer Setup (F10) Utility.2. Set the date and time under Control Panel or in F10 Setup, depending on the operating system.3. If the problem persists, replace the RTC battery.
163—Time and Date Not Set	Invalid time or date in configuration memory. RTC battery might need to be replaced. CMOS jumper might not be properly installed.	<ol style="list-style-type: none">1. Set the date and time under Control Panel or in F10 Setup depending on the operating system.2. If the problem persists, replace the RTC battery.
164—Memory Size Error	Memory configuration is incorrect.	<ol style="list-style-type: none">1. Run Computer Setup (F10) Utility or Windows utilities.2. Be sure memory modules (if any) are installed properly.3. If third-party memory has been added, test using HP memory only.4. Verify proper memory module type.
201—Memory Error	RAM failure.	<ol style="list-style-type: none">1. Run Computer Setup (F10) Utility or Windows utilities.2. Ensure that memory and continuity modules are installed correctly.3. Verify proper memory module type.4. Remove and replace memory modules one at a time to isolate faulty module.5. Replace the faulty memory modules.6. If error persists after replacing memory modules, replace the system board.
202—Memory Type Mismatch	Memory modules do not match each other.	Replace memory modules with matched sets.
207—ECC Corrected Single Bit Errors	Single-bit ECC error.	<ol style="list-style-type: none">1. Verify proper memory module type.2. Insert the DIMM in another memory socket.3. Replace memory module if problem persists.
212—Failed Processor	Processor has failed to initialize.	<ol style="list-style-type: none">1. Reseat the processor in its socket.2. If the processor does not respond, replace it.
213—Incompatible memory Module	A memory module in memory socket identified in the error message is missing critical SPD information or is incompatible with the chipset.	<ol style="list-style-type: none">1. Verify proper memory module type.2. Insert the DIMM in another memory socket.3. Replace memory with a module conforming to the SPD standard.
214—DIMM Configuration Warning	DIMMs not installed correctly (not paired correctly).	Refer to the service label on the inside of the access panel for correct memory configurations and reseat the DIMMs accordingly.

Table 5-18 POST error messages (continued)

Screen message	Probable cause	Recommended action
215—Memory Mismatch Warning	There are one or more mismatched pairs of DIMMs between channel A and channel B. Some memory has been disabled. Install matching pairs or remove the mismatched DIMMs from channel B.	See the illustration on the side access panel for the correct memory configurations and reseat the DIMMs accordingly.
216—Memory Size Exceeds Maximum Supported	The amount of memory installed exceeds that supported by the hardware.	<ol style="list-style-type: none">1. Verify the maximum amount of memory your system can support.2. Remove the excessive memory.
301—Keyboard Error	Keyboard failure.	<ol style="list-style-type: none">1. Reconnect the keyboard to different USB connector with workstation powered off.2. Check the connector for bent or missing pins.3. Ensure that none of the keys remain in the pressed position.4. Replace the keyboard.
303—Keyboard Controller Error	I/O board keyboard controller.	<ol style="list-style-type: none">1. Reconnect keyboard with workstation turned off.2. Replace the system board.
304—Keyboard or System Unit Error	Keyboard failure.	<ol style="list-style-type: none">1. Reconnect the keyboard with workstation turned off.2. Ensure that none of the keys remain in the pressed position.3. Replace keyboard.4. Replace system board.
410—Audio Interrupt Conflict	IRQ address conflicts with another device.	Reset the IRQ.
411—Network Interface Card Interrupt Conflict	IRQ address conflicts with another device.	Reset the IRQ.
501—Display Adapter Failure	Graphics display controller.	<ol style="list-style-type: none">1. Reseat the graphics card (if applicable).2. Clear CMOS.3. Verify that the monitor is attached and turned on.
510—Splash Screen image corrupted	Splash Screen image has errors.	Install latest version of SoftPaq to restore image. To download the most recent SoftPaq version, see: http://www.hp.com/support/workstation_swdrivers
511—CPU, CPUA, or CPUB Fan not detected	Fan is not connected or might have malfunctioned.	<ol style="list-style-type: none">1. Reseat the fan cable.2. Reseat the fan.3. Replace the fan.
512—Chassis, rear chassis, or front chassis fan not detected	Fan is not connected, might have malfunctioned.	<ol style="list-style-type: none">1. Reseat the chassis, rear chassis, or front chassis fan cable.2. Reseat the chassis, rear chassis, or front chassis fan.3. Replace the chassis, rear chassis, or front chassis fan.

Table 5-18 POST error messages (continued)

Screen message	Probable cause	Recommended action
514—CPU or Chassis Fan not detected	Processor fan is not connected or might have malfunctioned.	<ol style="list-style-type: none">1. Reseat the processor or chassis fan.2. Replace the processor or chassis fan.
601—Diskette Controller Error	Diskette controller circuitry or diskette drive circuitry incorrect.	<ol style="list-style-type: none">1. Run the Computer Setup (F10) Utility.2. Verify and replace cables.3. Clear CMOS.4. Replace diskette drive.5. Replace the system board.
605—Diskette Drive Type Error	Mismatch in drive type.	<ol style="list-style-type: none">1. Run the Computer Setup (F10) Utility.2. Disconnect any other diskette controller devices (tape drives).3. Clear CMOS.
611—Primary Diskette Port Address Assignment Conflict	Configuration error.	<ol style="list-style-type: none">1. Run the Computer Setup (F10) Utility.2. Remove expansion cards.3. Clear CMOS.
912—Computer Cover Has Been Removed Since Last System Start Up	N/A	No action required.
914—Hood Lock Coil is not Connected	Hood lock mechanism is missing or not connected.	<ol style="list-style-type: none">1. Reconnect or replace hood locking mechanism.2. Reseat or replace hood locking mechanism cable.
916—Power Button Not Connected	The power button is not connected.	Connect power button.
917—Front Audio Not Connected	The front audio cable is not connected.	Connect front audio cable.
918—Front USB Not Connected	Front USB is not connected.	Connect front USB cable.
919—MultiBay Riser Not Connected	MultiBay riser is not connected.	Connect MultiBay riser.
960—Processor Overtemp occurred	The ambient temperature could exceed operating limits (maximum=95°F, 35°C), or there are obstructions to airflow, including dust build up.	<ol style="list-style-type: none">1. Be sure you are not operating the system in an environment that exceeds 95°F (35°C).2. Disconnect power and open the access panel.3. Verify that cables are not blocking processor heatsink fans or front fan, if installed.4. Verify that there is not excessive dust on major components.5. If airflow is acceptable and there is not excessive dust, the thermal sensing circuitry has failed on the processors or on the system board. You must replace the processors and/or the system board.
1151—Serial Port 1 Address Conflict Detected	Both external and internal serial ports are assigned to COM1.	<ol style="list-style-type: none">1. Remove any Comm port expansion cards.2. Clear CMOS.

Table 5-18 POST error messages (continued)

Screen message	Probable cause	Recommended action
		<ol style="list-style-type: none">3. Reconfigure card resources and run the Computer Setup (F10) Utility.4. Run the Computer Setup (F10) Utility or Windows utilities.
1152—Serial Port 2 Address Conflict Detected	Both external and internal serial ports are assigned to COM2.	<ol style="list-style-type: none">1. Remove any Comm port expansion cards.2. Clear CMOS.3. Reconfigure card resources and run the Computer Setup (F10) Utility.4. Run the Computer Setup (F10) Utility or Windows utilities.
1155—Serial Port Address Conflict Detected	Both external and internal serial ports are assigned to same IRQ.	<ol style="list-style-type: none">1. Remove any Comm port expansion cards.2. Clear CMOS.3. Reconfigure card resources and run the Computer Setup (F10) Utility.4. Run the Computer Setup (F10) Utility or Windows utilities.
1201—System Audio Address Conflict Detected	Device IRQ address conflicts with another device.	Reset the IRQ.
1720 SMART Hard Drive Detect Imminent Failure	Hard drive is about to fail. (Some hard drives have a firmware patch that will fix an erroneous error message.)	<ol style="list-style-type: none">1. Determine if hard drive is giving correct error message.2. Run the Drive Protection System test if applicable.3. Apply firmware patch if applicable (see: http://www.hp.com/support/workstation_swdrivers).4. Back up contents and replace hard drive.
1780—Disk 0 Failure	The drive is not installed correctly or has failed.	<ol style="list-style-type: none">1. Be sure that any jumpers are set correctly, and that power and drive cables are connected, both to the drive and the system board.2. Verify that the cables are the correct cables for your computer model. If this message persists, you might need service for your workstation.
1781—Disk 1 Failure	The drive is not installed correctly or has failed.	<ol style="list-style-type: none">1. Be sure that any jumpers are set correctly and that power and drive cables are connected, both to the drive and the system board.2. Verify that the cables are the correct cables for your computer model. If this message persists, you may need service for your workstation.
1782—Disk Controller Failure	Hard drive circuitry error.	<ol style="list-style-type: none">1. Run the Computer Setup (F10) Utility.2. Clear CMOS.3. Verify cable seating/jumper settings.4. Run hard drive diagnostics.5. Disconnect additional drives.6. Run the Drive Protection System test if available.

Table 5-18 POST error messages (continued)

Screen message	Probable cause	Recommended action
		<ol style="list-style-type: none">7. Replace the hard drive.8. Replace the system board.
1790—Disk 0 Error	The drive is not installed correctly or has failed.	<ol style="list-style-type: none">1. Be sure that any jumpers are set correctly and that power and drive cables are connected, both to the drive and the system board.2. Verify that the cables are the correct cables for your computer model. If this message persists, you may need service for your workstation.
1791—Disk 1 Error	The drive is not installed correctly or has failed.	<ol style="list-style-type: none">1. Be sure that any jumpers are set correctly and that power and drive cables are connected, both to the drive and the system board.2. Verify that the cables are the correct cables for your computer model. If this message persists, you may need service for your workstation
1792—Secondary Disk Controller Failure	Hard drive circuitry error.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup).2. Clear CMOS.3. Verify cable seating/jumper settings.4. Run hard drive diagnostics.5. Disconnect additional drives.6. Run the Drive Protection System test if available.7. Replace the hard drive.
1793—Secondary Controller or Disk Failure	Hard drive circuitry error.	<ol style="list-style-type: none">1. Run the Computer Setup (F10) Utility.2. Clear CMOS.3. Verify cable seating/jumper settings.4. Run hard drive diagnostics.5. Disconnect additional drives.6. Run the Drive Protection System test if available.7. Replace the hard drive.
1801—Microcode Patch Error	Processor not supported by ROM BIOS.	Upgrade BIOS to proper version.
1802—Processor Not Supported	The system board does not support the processor.	Replace the processor with a compatible one.
1803-BIOS Update Needed for Processor	This BIOS revision does not support the installed processor.	Install the latest BIOS downloaded from http://www.hp.com/support/workstation_swdrivers .
1998—Master Boot Record has been lost	The previously saved copy of the MBR has been corrupted.	Run the Computer Setup (F10) Utility and save the MBR of the current bootable disk.
Invalid Electronic Serial Number	Electronic serial number has become corrupted.	Run the Computer Setup (F10) Utility. If Setup already has data in the field or will not allow the serial number to be entered, download from http://www.hp.com/support/workstation_swdrivers and run the utility SP5572.EXE (SNZERO.EXE).
		Run the Computer Setup (F10) Utility and try to enter serial number under Security, System ID, and save the changes.

Table 5-18 POST error messages (continued)

Screen message	Probable cause	Recommended action
ECC Multiple Bit Error Detected in Memory Module	Chipset has detected more than one bad bit in a 64-bit quadword of the memory array.	Replace the memory module.
Parity Check 2	Parity RAM failure.	Run the Computer Setup (F10) Utility and Diagnostic utilities.

6 Configuring RAID devices

This chapter describes how to configure SATA RAID devices for use with an HP xw4550 Workstation.

For additional information about configuring RAIDs, see http://www.hp.com/support/RAID_FAQs. For information about preparing your workstation for RAID configuration, see http://www.hp.com/support/workstation_manuals.

Introduction

This document describes the steps necessary to setup RAID 0, RAID 1 and JBOD configurations on an HP xw4550 Workstation. For additional information on RAID configurations, see <http://h10032.www1.hp.com/ctg/Manual/c00786213.pdf>.

Configuring SATA RAID devices

Installing drives

With the workstation powered off, install the correct number of SATA hard drives using the lower of four SATA ports in the workstation chassis.

The following table indicates the number of drives to install.

	RAID 0	RAID 1	JBOD
Number of disks	2	2	1 or 2

Enabling RAID

1. Boot the workstation and enter the Computer Setup (F10) Utility.
2. Use the arrow keys to select **Storage>Storage Options**, and then press **Enter**.
3. Use the up and down arrow keys to select **SATA EMULATION**.
4. Use the left and right arrow keys to change SATA EMULATION to **RAID**.
5. Press **F10** two times, and then press **Enter** to save the settings.

The workstation now reboots.

Configuring RAID volumes

After RAID is enabled in BIOS and the workstation is booted, **Press Ctrl-F to enter FastBuild™ Utility** appears on the monitor. When it appears, press **Ctrl-F**.

The first utility window to appear enables you to view, define, and delete logical drives (LD).

Assessing drive assignments

1. To identify the drive assignments, select **1** and verify that all drives are free.
2. If a drive is not free, use the **Delete** function to remove its designator.
3. Press **Esc** to exit the function.

Deleting arrays

To delete an array

1. Select **3** and highlight the logical drive to delete.
2. Press **DEL** or **Delete**, and then press **Ctrl-Y** to confirm the delete.
3. Press **Esc** to exit the function.

Defining arrays

To define an array:

1. Select **2**. When **LD1** appears on the screen, press **Enter**.

A configuration menu appears on the screen. It contains the following configuration parameters and default values:

Parameter	Available values	Default value
RAID Mode	RAID 0, RAID 1, JBOD	RAID 0
Stripe Block	64 KB, 128 KB	64 KB
Fast Init	ON, OFF	ON
Gigabyte Boundary	ON, OFF	ON
Cache Mode	Write-Thru	Write-Thru
Assignment (Drive 1 and Drive 2)	N, Y	N

2. Perform the following steps to change any parameter:
 - a. Use the arrow keys to move the cursor to the desired parameter.
 - b. Press **Space** to toggle to the desired parameter value.Ensure that you assign a drive to be part of the array by setting its Assignment parameter to **Y**.
3. To conclude array definition, choose one of the following:
 - To save the array, press **Ctrl-Y**.
 - To clear the Master Boot Record (MBR), press **Ctrl-Y**.
 - Press **Enter** to use maximum capacity.

Exiting the utility

To conclude RAID configuration, choose one of the following:

- Press **Esc** twice to exit the utility.
- Press **Y** to reboot.

Configuring the boot order

1. Reboot the workstation and enter the Computer Setup (F10) Utility.
2. Select **Storage>Boot Order**.
3. Use the arrow keys to select **ATAPI CD-ROM Drive**, and then press **Enter**.
4. Use the up and down arrow keys to move **ATAPI CD-ROM Drive** to the top position, and then press **Enter**.
5. Verify that the xw4550 Recovery/OS CD/DVD is installed in the optical drive.
6. Press **F10** twice, press **Enter**, and then press **F10** again to accept changes and reboot.

Rebuilding the operating system

When the recovery CD boots, follow the onscreen instructions to install the operating system on the newly-created RAID Volume.

7 Configuring password security and resetting CMOS

Preparing to configure passwords

This workstation supports the following security password features, which can be established through the Computer Setup (F10) Utility menu:

- Setup password
- Power-on password

When you establish a setup password, only the power-on password is required to access the Computer Setup (F10) Utility and any other information on the workstation. When you establish both passwords, only the setup password will give you access to the Computer Setup (F10) Utility.

When both passwords are set, the setup password can also be used in place of the power-on password as an override to log in to the workstation, which is a useful feature for a network administrator.

If you forget the password for the computer, two methods are available for clearing that password so you can gain access to the information on the workstation:

- Reset the password jumper
- Use the **Clear CMOS** spring-loaded slider switch.

△ **CAUTION:** Pushing the CMOS switch to detente resets CMOS values to factory defaults and erases any customized information, including passwords, asset numbers, and special settings. It is important to back up the workstation CMOS settings before resetting them in case they are needed later. To back up the CMOS settings, use the Computer Setup (F10) Utility and run the Save to Diskette option from the File menu.

Resetting the password jumper

To disable the power-on or setup password features and clear the power-on and setup passwords:

1. Shut down the operating system, and power off the workstation and any external devices. Disconnect the power cord of the workstation and any external devices from the power outlets.
2. Disconnect the keyboard, monitor, and any other external devices that are connected to the workstation.

⚠ **WARNING!** To reduce the risk of personal injury from electrical shock and hot surfaces, be sure to disconnect the power cord from the line voltage power outlet and allow the internal system components to cool before touching.

⚠ **CAUTION:** When the workstation is plugged in, the power supply always has voltage applied to the system board even when the workstation is turned off. Failure to disconnect the power cord can result in damage to the system.

CAUTION: Static electricity can damage the electronic components of the workstation or optional equipment. Before beginning these procedures, be sure that you are discharged of static electricity by briefly touching a grounded metal object.

3. Remove the access panel.
4. Locate the password header and jumper. The password header is E49 on the system board.

📝 **NOTE:** The password jumper is green so that it can be easily identified. For assistance locating the password jumper and other system board components, see the service label located on the inside of the workstation access panel.

5. Remove the jumper from either pin 1 or 2. Place the jumper on pins 1 and 2 (connecting both pins together).
6. Replace the access panel.
7. Reconnect the external equipment.
8. Plug in and power on the workstation. Allow the operating system to start. This process clears the current passwords and disables the password features.
9. To establish new passwords, repeat steps 1 through 4, replace the password jumper on either pin 1 or pin 2 (but not both), and repeat steps 6 through 8. Establish the new passwords in the Computer Setup (F10) Utility.

Clearing and Resetting the CMOS

The CMOS of the workstation stores password information and information about the workstation configuration. This section describes the steps to successfully clear and reset the CMOS.

Using the CMOS switch

1. Shut down the operating system, and power off the workstation and any external devices. Disconnect the workstation power cord and any external devices from the power outlets.
 2. Disconnect the keyboard, monitor, and any other external devices that are connected to the workstation.
-  **WARNING!** To reduce the risk of personal injury from electrical shock and hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.
-  **CAUTION:** When the workstation is plugged in to a line voltage source, voltage is continuously applied to the system board even when the unit is powered off. Failure to disconnect the power cord can result in damage to the system.
- CAUTION:** Static electricity can damage the electronic components of the workstation or optional equipment. Before beginning these procedures, be sure that you are discharged of static electricity by briefly touching a grounded metal object.
3. Remove the access panel.
-  **CAUTION:** It is important to back up the workstation CMOS settings before resetting them in case they are needed later. Activating the CMOS switch resets CMOS values to factory defaults and erases any customized information, including passwords, asset numbers, and special settings. To back up the CMOS settings, use the Computer Setup (F10) Utility and run the Save to Diskette option from the File menu.
4. Locate, press, and hold the CMOS switch in the detente position for five seconds.
-  **NOTE:** Ensure that the AC power cord is disconnected from the power outlet. The CMOS switch does not clear CMOS if the power cord is connected.
- NOTE:** To locate the CMOS switch and other system board components, see the service label located on the inside of the workstation access panel or the [System board components on page 56](#) section of this guide.
5. Replace the access panel.
 6. Reconnect any external devices.
 7. Plug in and power on the workstation.
- The workstation will power up for 3-to-5 seconds, then power off.
-  **NOTE:** You must reset the workstation passwords and any special configurations, along with the system date and time.

Using the Computer Setup (F10) Utility to reset CMOS

1. To reset CMOS using the Computer Setup (F10) Utility, access the Computer Setup (F10) Utility menu. When the Computer Setup message appears in the lower-right corner of the screen, press the **F10** key. Press **Enter** to bypass the title screen, if necessary.

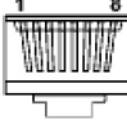
 **NOTE:** If you do not press the **F10** key while the message is displayed, the workstation must be powered off, then on again, to access the utility.
2. From the Computer Setup (F10) Utility menu, select **File>Set Defaults** and **Exit**. This restores the soft settings that include boot sequence order and other factory settings. It does not, however, force hardware rediscovery.

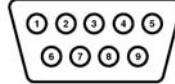
 **NOTE:** You must reset the workstation passwords and any special configurations, along with the system date and time.

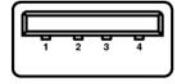
A Appendix A—Workstation connector pins

Connector pin descriptions

This appendix provides connector pin and signal descriptions for connectors used with the HP xw4550 Workstation.

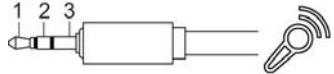
Workstation Ethernet connector	Pin	Signal
	1	(+) Transmit Data
	2	(-) Transmit Data
	3	(+) Receive Data
	4	Unused
	5	Unused
	6	(-) Receive Data
	7	Unused
	8	Unused

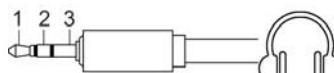
Workstation serial connector	Pin	Signal
 	1	Carrier Detect
	2	Receive Data
	3	Transmit Data
	4	Data terminal ready
	5	Signal ground
	6	Data set ready
	7	Request to Send
	8	Clear to Send
	9	Ring Indicator

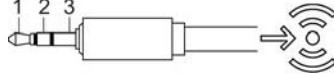
Workstation USB connector	Pin	Signal
	1	+5 VDC
	2	- Data
	3	+ Data

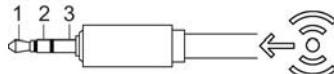
Workstation USB connector	Pin	Signal
	4	Ground

Workstation IEEE 1394 connector	Pin	Signal
	1	Power
	2	GND
	3	TPB-
	4	TPB+
	5	TPA-
	6	TPA+

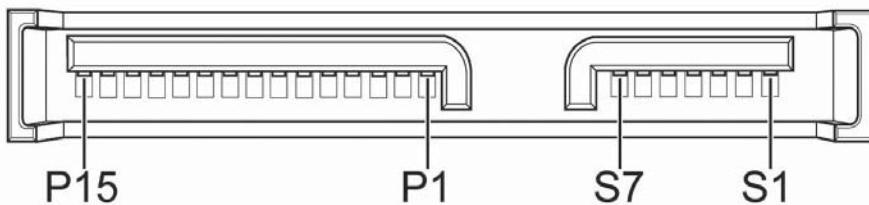
Microphone cable connector (1/8 inch)	Pin	Signal
	1 (Tip)	Audio
	2 (Ring)	Power
	3 (Shield)	Ground

Headphone cable connector (1/8 inch)	Pin	Signal
	1 (Tip)	Audio_Left
	2 (Ring)	Audio_Right
	3 (Shield)	Ground

Line-in audio cable connector (1/8 inch)	Pin	Signal
	1 (Tip)	Audio_In_Left
	2 (Ring)	Audio_In_Right
	3 (Shield)	Ground

Line-out audiocable connector (1/8 inch)	Pin	Signal
	1 (Tip)	Audio_Out_Left
	2 (Ring)	Audio_Out_Right
	3 (Shield)	Ground

SATA drive connector



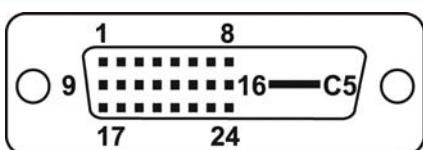
Data Pins		Power Pins		Power Pins	
Pin	Signal	Pin	Signal	Pin	Signal
S1	Ground	P1	3.3-V power	P8	5-V power
S2*	A+	P2	3.3-V power	P9	5-V power
S3*	A-	P3	3.3-V power	P10	Ground
S4	Ground	P4	Ground	P11	Reserved
S5**	B-	P5	Ground	P12	Ground
S6**	B+	P6	Ground	P13	12-V power
S7	Ground	P-7	5-V power	P14	12-V power
* S2 and S3 differential signal pair				P15	12-V power
**S5 and S6 differential signal pair					

Workstation VGA connector



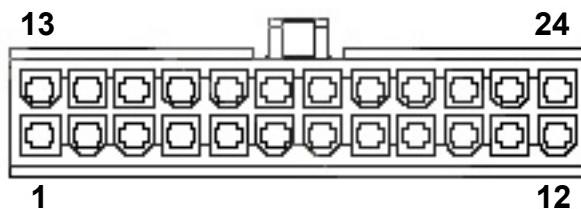
Pin	Signal	Pin	Signal	Pin	Signal
1	Red Analog	6	GND	11	Monitor ID
2	Green Analog	7	GND	12	DDC Serial Data
3	Blue Analog	8	GND	13	Horizontal Sync
4	Monitor ID	9	+5V DC	14	Vertical Sync
5	GND	10	GND	15	DDC Serial Clock

Workstation DVI-D connector



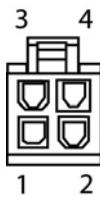
Pin	Signal	Pin	Signal
1	T.M.D.S DATA 2-	14	+5V POWER
2	T.M.D.S DATA 2+	15	GND
3	T.M.D.S DATA 2/4 SHIELD	16	HOT PLUG DETECT
4	T.M.D.S DATA 4-	17	T.M.D.S DATA 0-
5	T.M.D.S DATA 4+ 2	18	T.M.D.S DATA 0+
6	DDC CLOCK	19	T.M.D.S DATA 0/5 SHIELD
7	DDC DATA	20	T.M.D.S DATA 5-
8	ANALOG VERT. SYNC	21	T.M.D.S DATA 5+
9	T.M.D.S DATA 1-	22	T.M.D.S CLOCK SHIELD
10	T.M.D.S DATA 1+	23	T.M.D.S CLOCK+
11	T.M.D.S DATA 1/3 SHIELD	24	T.M.D.S CLOCK-
12	T.M.D.S DATA 3-		
13	T.M.D.S DATA 3+	C5	GROUND

24-Pin Main power cable connector (mates with system board connector P1)



Pin	Color	Signal	Pin	Color	Signal	Pin	Color	Signal	Pin	Color	Signal
1	Orange	+3.3V	7	Black	GND	13	Orange	+3.3V	19	Black	GND
2	Orange	+3.3V	8	Grey	POK	14	Blue	-12V	20		Reserved
3	Black	GND	9	Purple	+5 Vaux	15	Black	GND	21	Red	+5V
4	Red	+5V	10	Yellow	+12 V	16	Green	PS_ON_L	22	Red	+5V
5	Black	GND	11	Yellow	+12 V	17	Black	GND	23	Red	+5V
6	Red	+5V	12	Orange	+3.3V	18	Black	GND	24	Black	GND

4-Pin power (processor/memory/aux. sys. board) cable connector (mates with system board connector P3)	Pin	Color	Signal
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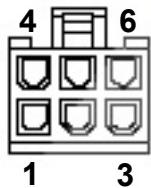


CAUTION: The 4-pin power cable connector is the color white. You must mate it ONLY with white system board connector P3. Mating this cable with any other system board connector and applying power might damage your system board and void your warranty.

1	BLK	GND
2	BLK	GND

3	BRN	+12VCPU
4	BRN	+12VCPU

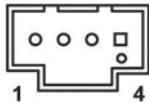
Auxiliary 6-pin power cable connector for optional PCI Express graphics card	Pin	Color	Signal
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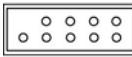
1	YEL	+12VCPU
2	YEL	+12VCPU
3	YEL	+12VCPU
4	BLK	GND
5	BLK	GND
6	BLK	GND

NOTE: This connector and optional cable connect between an installed PCI Express graphics card auxiliary power connector and the system board "Graphic Pwr" connector P4 for graphics cards that use more than 75 watts of power.

AUX_IN (auxiliary audio)	Pin	Signal
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1	AUX_LEFT
2	AGND
3	AGND
4	AUX_RIGHT

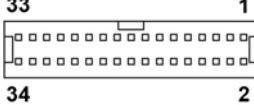
Internal USB system board 2x5 connector	Pin	Signal
The 2x5 internal USB system board connector can be mated to either a wide 2x5 option cable connector or a narrow 1x5 option cable connector.	1	+5V
	2	+5V
	3	USB6#
	4	USB7#
9 1  10 2	5	USB6

CAUTION: Possible equipment damage.

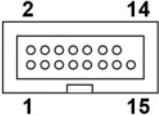
Always key all option connectors to the blank pin 9 position to prevent damage to connectors and equipment. Always connect a narrow 1x5 option cable connector to pins 1,3,5, and 7 only.

6	USB7
7	GND
8	GND
9	(pin not keyed)
10	(not connected)

System fan (rear chassis), processor fan, and PCI fan (front chassis) system board connectors	Pin	Signal
	1	Ground
	2	+12V
	3	Tach
	4	CMD

Floppy (diskette) drive	Pin	Signal	Pin	Signal
	1	Ground	18	FLP_DIR#
	2	FLP_LOWDEN#	19	Ground
	3	unused	20	FLP_STEP#
	4	FLP_WDO	21	Ground
	5	unused	22	FLP_WR_D#
	6	unused	23	Ground
	7	Ground	24	FLP_WRTEN#
	8	FLP_INDEX#	25	Ground
	9	Ground	26	FLP_TRACK#
	10	FLP_MOTOR#	27	Ground

Floppy (diskette) drive	Pin	Signal	Pin	Signal
	11	Ground	28	FLP_WP#
	12	Unused	29	Ground
	13	Ground	30	FLP_RD_D#
	14	FLP_SEL_A#	31	Ground
	15	Ground	32	FLP_HD_SEL#
	16	Unused	33	Ground
	17	Ground	34	FLP_DSKCHG#

Internal serial	Pin	Signal	Pin	Signal
	1	DTR2#	9	+5V
	2	RXD2	10	+3.3V AUX
	3	CTS2#	11	RTS2#
	4	DSR2#	12	COMM_B_DET#
	5	TXD2	13	DCD2#
	6	R12#	14	-12V
	7	Ground	15	+12V
	8	Ground		

B Appendix B—System board designators

This appendix lists the system board designators for this system.

Designator	Silkscreen	Component
DIMM1A	DIMM1A	DIMM slot 1, channel A connector
DIMM1B	DIMM1B	DIMM slot 1, channel B connector
DIMM2A	DIMM2A	DIMM slot 2, channel A connector
DIMM2B	DIMM2B	DIMM slot 2, channel B connector
E49	Password Enable	Clear password header/jumper
J9		RJ 45 and dual USB in combined housing
J10		Quadruple stacked USB in combined housing
J20	SLOT3 PCI32/33	PCI slot
J21	SLOT4 PCI32/33	PCI slot
J31	SLOT2_PCIE x4(1)	PCI Express slot
J41	SLOT1_PCIE x16	PCI Express slot
J65		DVI-D Connector
J69		Combined VGA and Standard serial (COM 1) connector in combined housing
J78		Double stacked audio jack
P1	Power Connector	Main power supply connector (24-pin)
P3	Power Connector	CPU 12V power connector (4-pin)
P4	Graphic Pwr	6-pin power (auxiliary PCI Express) cable connector
P5	CONTROL PANEL	Front control panel connector
P6	SPK	Speaker connector
P8	PCI FAN	PCI fan connector (optional)
P9	SYS_FAN	System fan connector
P10	FLOPPY	Diskette drive connector
P11	AUX_IN	Internal Aux-in audio connector
P23	FRONT AUDIO	Front audio connector
P24	FRONT USB	Front USB Connector
P52	COM2	Internal serial connector

Designator	Silkscreen	Component
P60-63	SATA0, SATA1, SATA2, SATA3	SATA Connector ports
P70	CPU_FAN	processor fan connector
P124	Hood Lock	Internal Hood Lock Connector
P125	Hood Sense	Internal Hood Sense Connector
P150	INTERNAL USB	Internal USB Connector
SW50	CMOS (Push slider to clear)	Clear CMOS slider switch SW50
XBT1	BATTERY	Battery socket connector
XU1	CPU	Processor chip

C Appendix C—Routine care

General cleaning safety precautions

- Never use solvents or flammable solutions to clean the workstation.
- Never immerse any component in water or cleaning solutions; apply any liquids to a clean cloth and then use the cloth on the component.
- Always unplug the workstation before cleaning the keyboard, mouse, or air vents.
- Always disconnect the keyboard before cleaning it.
- Wear safety glasses equipped with side shields when cleaning the keyboard.

Cleaning the workstation case

- Follow the safety precautions presented in before cleaning the workstation.
- To remove light stains or dirt, use plain water with a clean, lint-free cloth or swab.
- For stronger stains, use a mild dish-washing liquid diluted with water. Rinse well by wiping it with a cloth or swab dampened with clear water.
- For stubborn stains, use isopropyl (rubbing) alcohol. No rinsing is needed because the alcohol will evaporate quickly and not leave a residue.
- After cleaning, always wipe the unit with a clean, lint-free cloth.
- Occasionally clean the air vents on the workstation. Lint and other foreign matter can block the vents and limit the airflow.

Cleaning the keyboard

△ **CAUTION:** Use safety glasses equipped with side shields before attempting to clean debris from under the keys.

- Follow the safety precautions presented in [Service considerations on page 50](#) before cleaning the keyboard.
- Visible debris underneath or between the keys can be removed by vacuuming or shaking.
- Canned, pressurized air can be used to clean debris from under the keys. Use caution because too much air pressure can dislodge lubricants applied under the wide keys.
- If you remove a key, use a specially designed key puller to prevent damage to the keys. This tool is available through many electronic supply outlets.

△ **CAUTION:** Never remove a wide leveled key (like the space bar) from the keyboard. If these keys are improperly removed or installed, the keyboard might not function properly.

- Clean under a key with a swab moistened with isopropyl alcohol and squeezed out. Be careful not to wipe away lubricants necessary for proper key functions. Allow the parts to air dry before reassembly.
- Use tweezers to remove any fibers or dirt in confined areas.

Cleaning the monitor

- Follow the safety precautions presented in [Service considerations on page 50](#) before cleaning the keyboard.
 - To clean the monitor, wipe the monitor screen with a towelette designed for cleaning monitors or a clean cloth moistened with water.
- △ **CAUTION:** Do not use sprays or aerosols directly on the screen—the liquid might seep into the housing and damage a component.
- Never use solvents or flammable liquids on the monitor because display or housing damage may result.

Cleaning the mouse

1. Follow the safety precautions presented in [Service considerations on page 50](#) before cleaning the mouse.
2. Remove the mouse ball from the housing by removing the retaining plate.
3. Clean the mouse ball.
4. Pull out any debris from the ball socket, and wipe the ball with a clean, dry cloth.
5. Reassemble the mouse.